



# KOVARSON

**KOVARSON s.r.o.**

Lhota u Vsetína 4

755 01, Vsetín

tel. ČR: +420 571 420 926

tel. SR: +421 949 176 717

email: [info@kovarson.cz](mailto:info@kovarson.cz)

Installation and operation manual automatic  
boiler

## TIGER



Dear customer,

Thank you for purchasing an automatic solid fuel TIGER boiler and the trust you have put in KOVARSON s.r.o.

Please read this manual before putting your new boiler into operation to avoid unnecessary complications resulting from handling issues. Section 7 – *Operating the Boiler by the User*, Section 8 – *Important Instructions*, Section 9 – *Maintenance* and the *Operation Manual for the LIDER Control Unit* are particularly important.

To ensure a long and trouble-free boiler life, please follow the manufacturer's instructions as well as those of the authorized installation company that sets up your boiler.

## Content:

1. Boiler uses and benefits .....	- 4 -
2. Boiler technical specifications .....	- 4 -
3. Recommended fuel.....	- 6 -
4. Description.....	- 7 -
4.1 Boiler construction.....	- 7 -
4.2 Control, regulation and safety elements.....	- 10 -
5. Location and installation .....	- 11 -
5.1 Regulations and Requirements.....	- 11 -
6. Boiler installation .....	- 15 -
6.2 Installation procedure.....	- 16 -
7.1 Electrical Wiring .....	- 20 -
7.2 Pre-fire-up check list .....	- 21 -
7.3 Control unit parameters setting .....	- 22 -
7.4 Putting the boiler into operation - Firing up .....	- 23 -
7.5 superior regulation – room thermostat.....	- 25 -
8. Important instructions .....	- 26 -
9. Maintenance .....	- 27 -
10. Disposal of the product after a period of his life.....	- 28 -
11. Guarantee and liability for defects .....	- 28 -
12. Trouble shooting.....	- 29 -
EC DECLARATION OF CONFORMITY .....	- 30 -

## 1. Boiler uses and benefits

The TIGER boiler is designed to heat households, commercial buildings and other medium-sized structures economically and ecologically using an automatically controlled feeder for solid fuels and with minimal servicing. It can also be used as a boiler for domestic hot water (DHW).

### Boiler benefits:

- high efficiency
- cast iron body manufactured by a well-known Czech producer
- high exchanger durability
- universal burner - burns brown coal or wood pellets
- simple boiler controls
- unattended operation, boiler maintenance takes 10 minutes every 3 days
- electronically controlled fan speed managed by the control unit
- low power consumption
- in warm seasons, it can be used to heat DHW only
- controlled by a room thermostat
- option to order the boiler with the large hopper on the right or left

## 2. Boiler technical specifications

Tab.1 Dimensions and technical parameters of the boiler

Boiler model		TIGER 20	TIGER 25	TIGER 30	TIGER 35	TIGER 40	TIGER 48	TIGER 55
Number of sections	pcs	4	5	6	7	8	9	10
Weight	kg	384	438	547	594	634	713	778
Water volume	l	33.3	35	44.7	50.4	56.1	61.8	67.5
Flue diameter	mm	160	160	160	160	180	180	180
Combustion chamber volume	dm <sup>3</sup>	37.5	51	64.5	78	91.5	105	118.5
Combustion chamber depth	mm	295	405	515	625	735	845	955
Hopper capacity	dm <sup>3</sup>	290	290	290	290	290	290	290
Boiler dimensions	mm	see Figure 1						
Size of hopper loading window	mm	370x335	370x335	370x335	370x335	370x335	370x335	370x335
EN 303-5 boiler class	-	3	3	3	3	3	3	3
Maximum operating excess water pressure tolerance	bar	3						
Tested operating excess water pressure tolerance	bar	6						
Recommended operating temperature of heating water	°C	60 - 85						
Minimum temperature of returning water	°C	60						
Hydraulic pressure loss in the boiler at $\Delta T= 20/10K$	mbar	0.55÷1.82	0.76÷2.635	0.97÷3.45	1.15÷4.23	1.29÷5.08	1.5÷5.9	1.74÷6.71
Noise level	dB	67						
Flue draw when the emissions fan is running and system is at nominal output	Pa	14	14	14	14	17	19	22

Boiler connections - water heating	Js	G 2"						
- returning water	Js	G 2"						
Supply voltage	V	230						
Electric load (fan + motor)	W	170	170	170	170	170	210	210
International protection rating	-	IP20	IP20	IP20	IP20	IP20	IP20	IP20

Tab.2 Thermal technical parameters of the boiler (brown coal combustion)

Boiler model		<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
Number of sections	pcs	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Nominal output	kW	20	25	30	35	40	50	55
Minimum output	kW	6	7.5	9	10.5	12	15	16.5
Consumption of fuel at nominal output	kg.h <sup>-1</sup>	4.2	4.9	5.5	6.8	8.1	9.4	10.7
Consumption of fuel at minimum output	kg.h <sup>-1</sup>	1,2	1,4	1,7	2,0	2,3	2,7	3,0
Burning time at nominal output	h	> 6	> 6	> 6	> 6	> 6	> 6	> 6
Efficiency	%	79.9	79.5	79.2	78.8	78.5	78.3	78.1
temperature of emissions at nominal output	°C	182	172	166	157	163	169	175
temperature of emissions at reduced output	°C	97	101	105	109	106	103	100
Volume of emissions output at nominal level	kg.s <sup>-1</sup>	0.018	0.020	0.022	0.024	0.031	0.038	0.045
Volume of emissions output at reduced level	kg.s <sup>-1</sup>	0.008	0.010	0.012	0.013	0.017	0.020	0.024

Thermal technical parameters of the boiler (wood pellets combustion)

Boiler model		<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
Number of sections	pcs	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Nominal output	kW	20	25	30	35	40	50	55
Minimum output	kW	6	7.5	9	10.5	12	15	16.5
Consumption of fuel at nominal output	kg.h <sup>-1</sup>	5.0	6.1	7.3	8.4	10.2	12.1	14.0
Consumption of fuel at minimum output	kg.h <sup>-1</sup>	1.5	1.8	2.2	2.6	3.0	3.4	3.8
Burning time at nominal output	h	> 6	> 6	> 6	> 6	> 6	> 6	> 6
Efficiency	%	83.4	83.0	82.6	82.2	82.2	82.1	82.1
temperature of emissions at nominal output	°C	157	155	152	150	150	150	150
temperature of emissions at reduced output	°C	96	97	99	102	98	94	91
Volume of emissions output at nominal level	kg.s <sup>-1</sup>	0.014	0.017	0.021	0.024	0.030	0.036	0.041
Volume of emissions output at reduced level	kg.s <sup>-1</sup>	0.008	0.010	0.012	0.013	0.014	0.015	0.016

These values vary depending on the quality and type of fuel. Therefore, it is necessary to make corrections when adjusting the feeding cycle and fan speed. If, for example,

there is unburned fuel in the ash pan, the fan speed or feeding cycle needs to be adjusted. Or, conversely, if the burning fuel in moves toward the feeder, the fan speed should be reduced or more fuel added!

### 3. Recommended fuel

Warranty fuel parameters– fuel with which the tests were carried out in the National Testing Facility:

- Moisture content
- The content of volatile matter
- Ash fusion temperature
- Low sintering capacity
- Low expansion capacity

Tab.3 Fuel tested

Fuel	Fuel type	Operation	Granularity [mm]	Heating value [MJ.kg <sup>-1</sup> ]
Brown coal	nut 2	Automatic	10.25	16,5 - 19,5
Biomass	Wood pellets	Automatic	Ø6-8	15 - 19

Tab.4 Fuel tested - brown coal (automatic operation)

fuel	Diameter [mm]	Heating value [MJ.kg <sup>-1</sup> ]	the ash content [%]	moisture content [%]	sulfur content [%]	specific sulfur content [g/MJ]	Tar content in dry matter [%]	Tar content in combustible elements [%]
Sorted brown coal from the Bilina Mine (Úpravna uhří Ledvice) - nut 2	10.25	17.6	9.8	maximum 20	0.77	0.44	15.1	15.71

Wood pellets must satisfy at least one of the following specifications or standards:

- Specification number 14-2000 MŽP ČR
- DIN 517 31
- ÖNORM M 7135

Prescribed diameter of pellets      6 – 8 mm  
 Moisture content in a fuel                maximum 12%  
 Ash content                                    maximum 1.5%

CAUTION! Poor quality pellets may negatively affect output and boiler emission parameters.

## 4. Description

### 4.1 Boiler construction

The boiler construction meets ČSN EN 303-5 : 2000 requirements:

- boiler for CH - Part 5: boiler for DHW using solid fuel with manual or automatic feeding, at a nominal heat output of up to 300 kW - Terminology, requirements, testing and marking.

The core of the boiler is the cast-iron body. The body is composed of front, rear and middle sections. The main function of the boiler body is to transfer thermal energy from the exhaust gas to heat water. The upper cleaning door and the middle door are located on the front section. The smoke extension that funnels emissions to the flue is located on the back section.

The cast iron body is set on the base. The base is made from a 5mm-sheet of steel. The ash pan door is on the front of the base.

The burner is placed into the side wall of the base. The feeder shaft extends into the burner, where it is fastened on the far side. The screw feeder extends to the combustion chamber and pushes against a counter screw, which forces the fuel upwards. The upper part of the burner is made from two cast-iron rings.

Two ceramic plates are positioned inside the boiler body in front of the cleaning door to improve combustion.

The burner's ash pan is placed at the bottom of the base.

The burner is fed air by a fan placed on the flange of the burner under the fuel hopper. The fan can be regulated electronically.

The screw feeder is placed next to the covered fuel hopper. Boilers can be ordered in two variations:

- **right fed** – The fuel hopper is on the right side of the boiler body from the front perspective
- **left fed** – The fuel hopper is on the left side of the boiler body from the front perspective

There is wax plug inside the burner, which is the emergency extinguisher.

The boiler body, base and doors are insulated with non-toxic mineral insulation to minimize heat transmission losses to the surroundings.

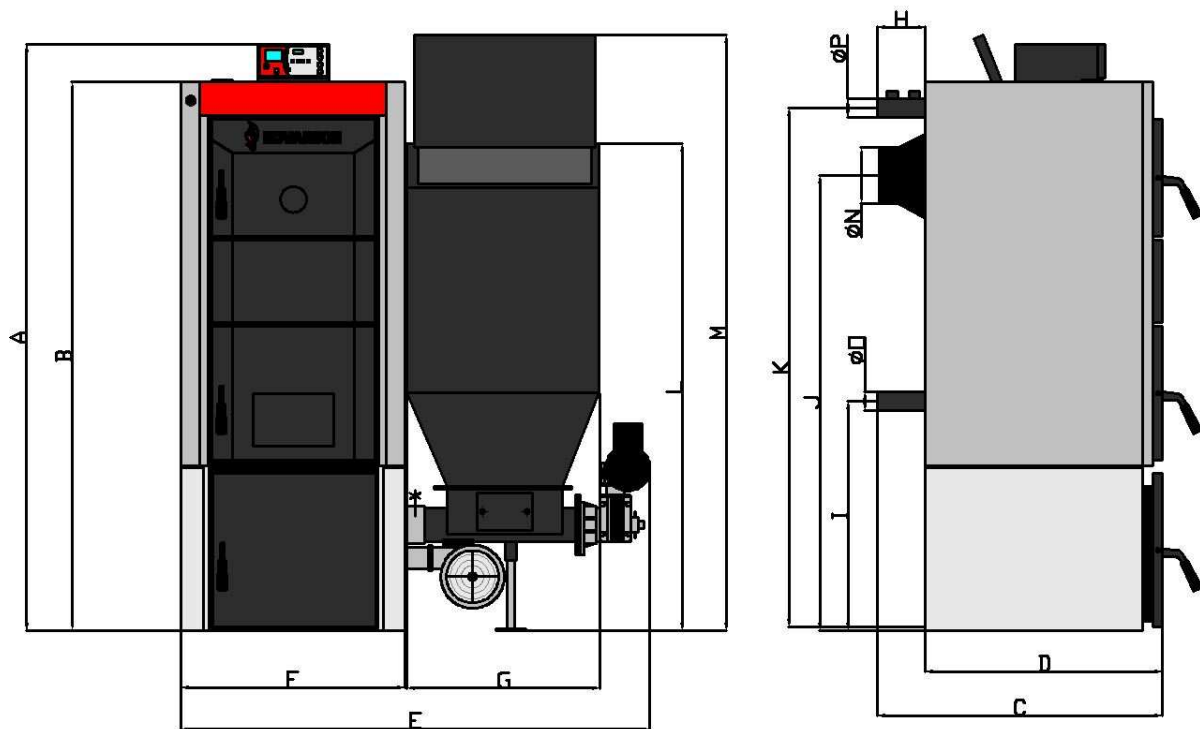


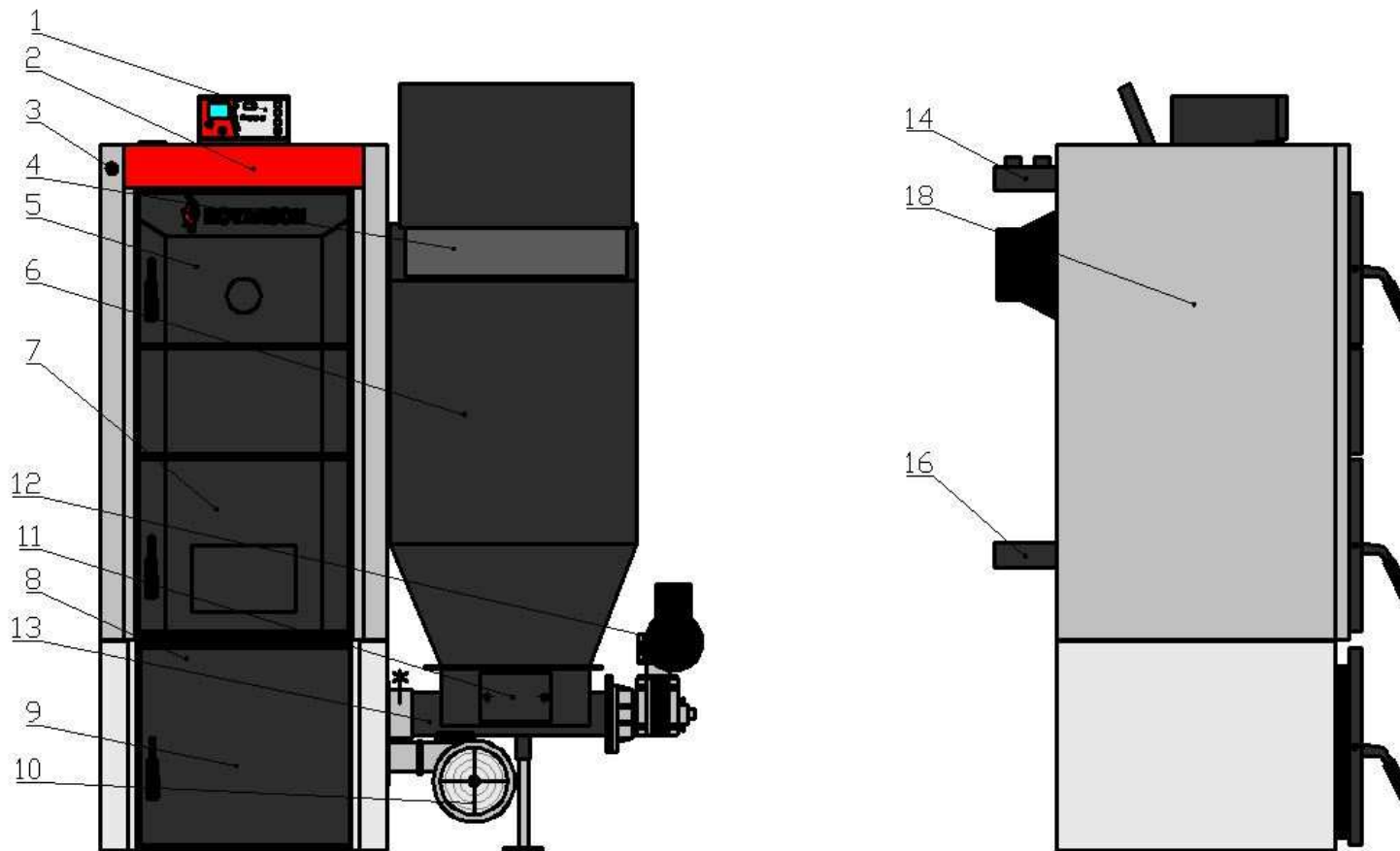
Figure1 Main boiler dimensions (right fed)

		A	B	C	D	E	F	G	H
<b>dimension</b>	4-7čl	1530	1445			1245	600	500	147
<b>mm</b>	8-10čl	1630	1545			1295	600	500	147

		I	J	K	L	M	N	O	P
<b>dimension</b>	4-7čl	620	1225	1400	1350	1710	158	2"	2"
<b>mm</b>	8-10čl	720	1325	1500	1450	1810	178	2"	2"

<b>Boiler</b>	<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
<b>Number of sections</b>	4	5	6	7	8	9	10
<b>C</b>	493	603	713	823	933	1043	1153
<b>D</b>	640	750	860	970	1080	1190	1300





- 1. LIDER control unit
- 2. boiler cover
- 3. flue damper
- 4. fuel hopper cover
- 5. top cleaning door
- 6. fuel hopper

- 7. middle door
- 8. base
- 9. lower door
- 10. fan
- 11. fuel hopper cleaning plate
- 12. feeder motor

- 13. fuel feeder
- 14. output of heating water
- 16. input for heating water
- 18. boiler body

## **4.2 Control, regulation and safety elements**

The LIDER electronic control unit manages and controls the system - see separate manual.

### **Safety elements:**

- An emergency heating system thermostat safeguards against overheating. It is set at 90° C by the manufacturer, above which temperature the fan shuts down for a certain time while the feeder works in cycles to smother the fire.
- A fuel tank temperature sensor safeguards the system against fuel back-burn. The factory setting is at 70°C, but the user may reset the temperature according to his/her needs. If the temperature is higher than the setting, the feeder motor is started up according to the time set in the control unit to smother the fire. This function is only available if the boiler is connected to a power source.
- There is an overheating safeguard for the motor. The normal operating temperature is anything below 80°C.
- Fire extinguishing equipment is included as an element of the safety system in case of back-burn. The system is triggered if the wax plug is melted – this happens if the temperature in the feeder exceeds 90°C. Water will be released from the plastic tank.

## **4.3 Boiler accessories**

### **Standard accessories:**

- Boiler operation and installation manual
- Control unit manual
- 2 ceramic top tiles ( 2 tiles)
- Ash pan
- Ash brush
- Poker
- emergency fire extinguisher with wax plug
- 2 flanges (upper and lower)
- 2 ¾" plugs
- fill/drain valve
- 2 shear fuses
- 2 reservoirs for sensors

## 5. Location and installation

### 5.1 Regulations and Requirements

The solid fuel boiler is only to be installed by heating specialists with a valid license for the installation and maintenance of such equipment. The installation project must be undertaken according to valid regulations.

The heating system must be filled with water that meets ČSN 07 7401 requirements and, in particular, its mineral content must not exceed the maximum parameters.

Recommended values		
Hardness	mmol/l	1
Ca <sup>2+</sup>	mmol/l	0,3
Total Fe & Mn concentration	mg/l	(0,3)*

**CAUTION!!! The manufacturer does not recommend the use of antifreeze.**

#### a) About the heating system

ČSN 06 0310	Heating systems in buildings - Design and installation
ČSN 06 0830	Heating systems in buildings – Safety equipment
ČSN 07 7401	Water and steam for thermal energy equipment with working pressure up to 8 MPa.
ČSN EN 303-5	CH boilers – Part 5: CH boilers for solid fuel with manual or automatic delivery, nominal heat output of up to 300 kW – Terminology, requirements, testing and marking.

#### b) About the chimney

ČSN 73 4201	Designing chimneys and flues.
-------------	-------------------------------

#### c) Due to fire regulations

ČSN 06 1008	Fire safety for heating equipment.
ČSN EN 13 501-1+A1	Fire hazard classification: Buildings and construction Buildings - Part 1: Classified from results of reaction to fire

#### d) The power supply

ČSN 33 0165	Electrical regulations. Marking of wires with colours or numbers. The implementing regulations.
ČSN 33 1500	Electro-technical regulations. Testing of electrical devices.
ČSN 33 2000-3	Electro-technical regulations. Electrical devices. Part 3: Declaration of the basic characteristics.
ČSN 33 2000-4-41	Electrical devices: Part 4: Safety Section 41: Protection against electric shock.
ČSN 33 2000-5-51 ed. 2	Electro-technical regulations. Construction of electrical devices.
ČSN 33 2130	Electro-technical regulations. Indoor electrical wiring.
ČSN 33 2180	Electro-technical regulations. Connection of electrical devices and appliances.

ČSN 34 0350	Electro-technical regulations. Regulations for mobile connections and cable placement.
ČSN EN 60 079-10	Electro-technical regulations. Regulations for electrical equipment in potentially explosive areas with flammable gases and vapours.
ČSN EN 60 079-14 ed.2	Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines).
ČSN EN 60 252-1	AC motor capacitors - Part 1: General - Performance, testing and rating - Safety requirements - Guide for installation and operation.
ČSN EN 60 335-1 ed.2	Electric appliances for household and similar purposes - Safety - Part 1: General requirements.
ČSN EN 60 335-2-102	Electric appliances for household and similar purposes Safety - Part 2-102: Specific requirements for appliances burning gas, oil and solid fuel and containing electrical connections.
ČSN EN 60 445 ed. 3	Basic and safety principles for man-machine interface, marking and identification.
ČSN EN 60 446	Basic and safety principles for man-machine systems – Identification of conductors by colours or numbers.
ČSN EN 61000 – 6 –3	EMC Part 6-3: Generic standards - Emission - for residential, commercial and light industry.
ČSN EN 61000 -3 – 2	EMC - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16).
ČSN EN 61000 – 3 –3	EMC – Part 3 - Limits - Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for devices with nominal current <16A.

#### **e) About the DHW heating system**

ČSN 06 0320	Heating systems inside buildings – DHW set-up – Design and planning.
ČSN 06 0830	Heating systems inside buildings – Safety equipment.
ČSN 73 6660	Indoor water systems

#### **5.2 placement options**

The boiler can be installed and operated in a simple environment AA5/AB5 according to CSN 33 2000-3. The boiler is equipped with a portable power cable and plug. The boiler must be in compliance with EN 60 335-1 ed. 2 Article 7.12.4, positioned so that the plug is accessible.

The installation and use of the boiler must comply with all ČSN 06 1008 requirements.

### **Location of the boiler in conformance to fire regulations:**

#### 1. Positioning on a floor made of non-combustible material:

- The boiler is to be set on a non-combustible insulating mat exceeding the dimensions of the boiler by 20 mm on all sides
- If the boiler is located in the basement, it is recommended that it be placed on a base at least 50 mm high. The boiler must stand horizontally level; any unevenness in the substructure is eliminated using the screws under the fuel hopper.

#### 2. Safe distance from combustible materials:

- when installing and operating the boiler a safe distance of 200 mm is to be maintained from combustible materials
- For highly flammable materials that can ignite quickly and sustain combustion after the source of ignition has been extinguished (e.g. paper, paperboard, cardboard, asphalt and tarpaper, wood and fibreboard, plastics, floor coverings), the safe distance is doubled to 400 mm.
- When in doubt about the combustibility of materials the clearance should be doubled (i.e. 400mm).

### **Operating clearance:**

- Roughly 1000 mm should be allowed for front clearance.
- The rear of the boiler must clear the wall by 400mm
- 1000 mm should be allowed for clearance on the hopper side in case the feeder screw needs to be removed.
- There should be at least 450 mm of clearance space above the boiler.

### **Electrical outlet and boiler placement:**

- The boiler must be positioned so that the electrical outlet (230 V/50 Hz) is always accessible.

### **Location of fuel**

- Dry fuel must be used for proper combustion. The manufacturer recommends that fuel be stored in a cellar or under shelter
- Do not store fuel less than 400 mm from the boiler.
- The recommended minimum distance between the boiler and fuel is 1000 mm or storage in separate room

There must be a continuous supply of air for combustion and ventilation in the boiler room.

Tab.6 – Air consumption

Boiler model	TIGER 20	TIGER 25	TIGER 30	TIGER 35	TIGER 40	TIGER 48	TIGER 55
Number of sections	4	5	6	7	8	9	10
Air consumption [m <sup>3</sup> .h-1]	45	60	75	90	105	120	135

All heating pipes must be installed by authorized personnel.

**CAUTION:** When connecting the boiler to the heating system the fill / drain valve must be placed as close as possible to the boiler.

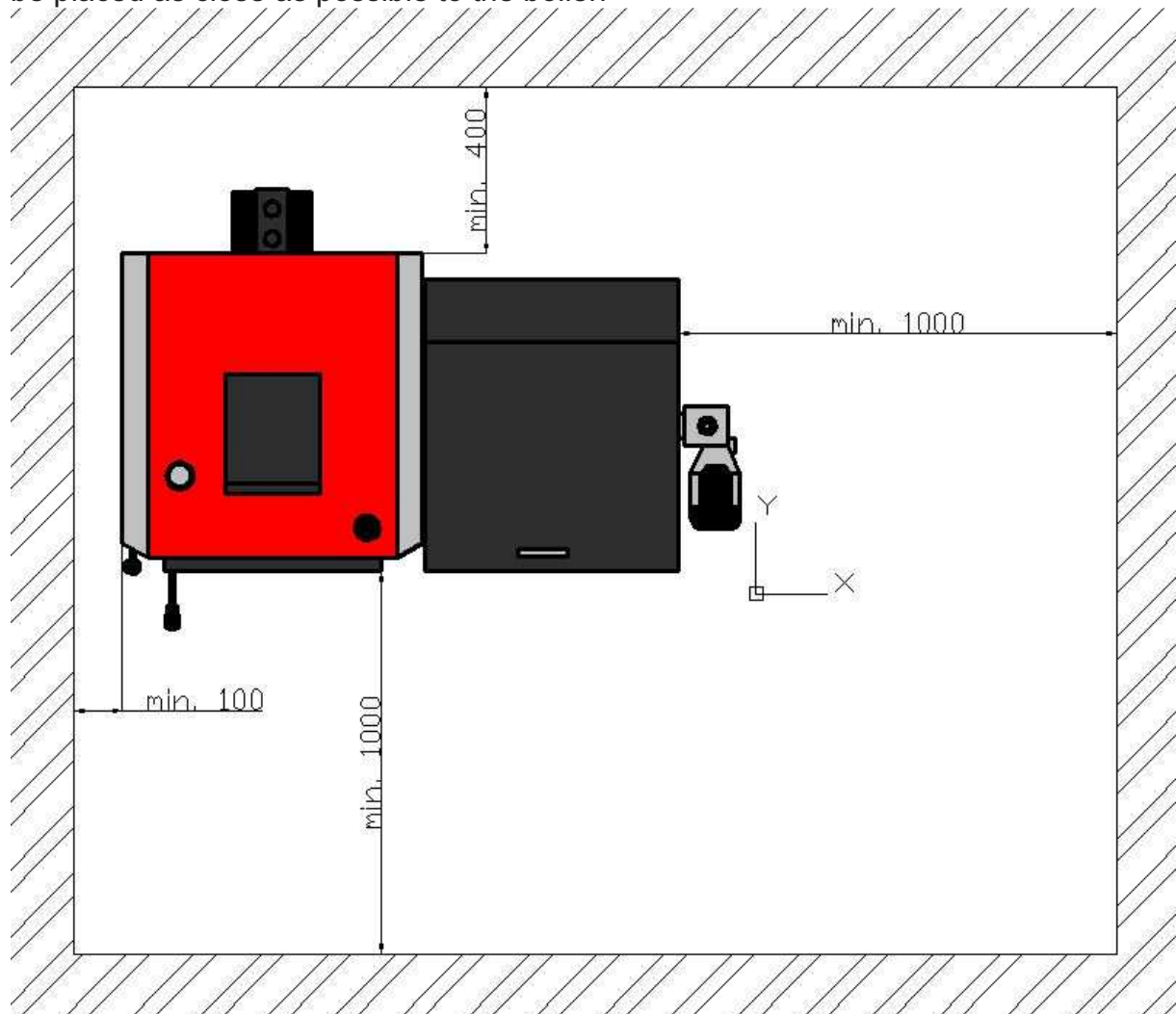


Figure2 Placement of the boiler

## **6. Boiler installation**

### **6.1 Packaging and accessories**

The boiler is delivered disassembled on 2 pallets. Accessories are shipped inside boiler body. Open the cleaning door to remove them. The base for the burner, the universal burner, the control unit, the fan, the fuel hopper and complete metal plating with mineral fibre insulation are delivered on the second pallet.

#### **Standard boiler delivery:**

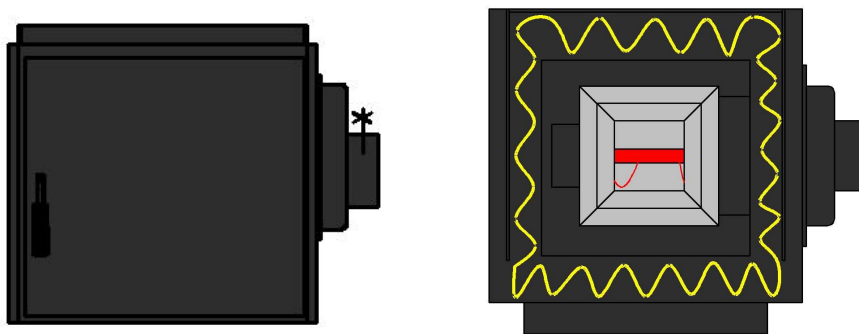
- 1 boiler on a palette in the particular number of sections
- The boiler casing with mineral fibre insulation
- 1 ash pan
- Cleaning tools (scraper, brush with handle, poker, 2 wall plugs, 2 threaded hooks)
- 1 thermo-manometer
- 1 1/2" fill/drain valve
- 1 6/4" end plug
- 2 seals ( $\varnothing$  60 x 48 x 2)
- 1 rod with handle to manipulate the damper
- 1 damper label
- Assembly hardware for the boiler body shell (4 spring clips, 4 connection pins, 16 8x13 ST4 bolts)
- Two 2" heating and returning water flanges (for sizes 4-7); one hot water flange (for sizes 8-10); and one "Y" pipe for returning water with flange
- 2 seals  $\varnothing$  90 x 60 x 3
- adjustment wrench
- technical and sales documentation
- LIDER control unit with temperature sensors and connectors
- fan with relevant output
- universal burner with relevant output
- One telescoping leg
- Assembly hardware for the burner and the base (four M12x30 bolts, four M12 nuts)
- stove sealant (1 tube)
- plastic ties for binding control unit cables
- 2 ceramic upper tiles
- One 1/2"- end plug
- 4 turbulators
- base covering
- fuel hopper
- boiler base
- assembly hardware for fan (four M6x30 bolts, four M6 nuts)
- assembly hardware for fuel hopper (six M8x30 bolts, six M8 nuts)
- rubber fan mat
- rubber fuel hopper mat

- two HEYCO grommets
- extinguishing system (one plastic tank, 3/8" 1 m hose, hose connector, 12mm compression fittings, two wax plugs)
- extinguishing system bracket
- assembly hardware for extinguishing system (two M6x10 flush-head screws, two M6 nuts)
- four tensioners (Ø8 mm)
- two 3/4" plugs
- two thermo-reservoirs

## 6.2 Installation procedure

### 6.2.1 Installation of the boiler body and base

1. Position the boiler body with the retaining wall at the base pad in a horizontal position.
2. Fill the space between the base and the boiler with sealant.
3. Connect the boiler's smoke outlet to the flue pipe in the chimney with a 160mm flue pipe.
4. Plug the 1 1/2" threaded holes in the front section of the boiler with plugs. Seal each plug with an O-ring.
5. Plug the 1/2" threaded holes in the front section of the boiler with plugs. Seal each plug with an O-ring.
6. Open the cleaning door and insert upper fire bri



Obr. č. 6 Sealing base

### 6.2.2 Mounting the casing

#### Boiler casing

1. Remove the casing components from box.
2. Fit the sheet metal components with the appropriate fasteners (see Figure 6 - 10 bolts - ST 4.8 x 13).
3. Assemble the boiler casing (see Figure 6)
4. Assemble the left and right casing components on the anchoring bolts and then add the front part of the casing. Bolt the rear part to the sides. On the side parts put the front seat with the inscription. Insert the thermo-manometer and capillary tubes into the upper part of the shell, leading to the recovery valve up the isolation



upper part of the shell. Care must be taken so that the capillary tubes do not touch the boiler body.

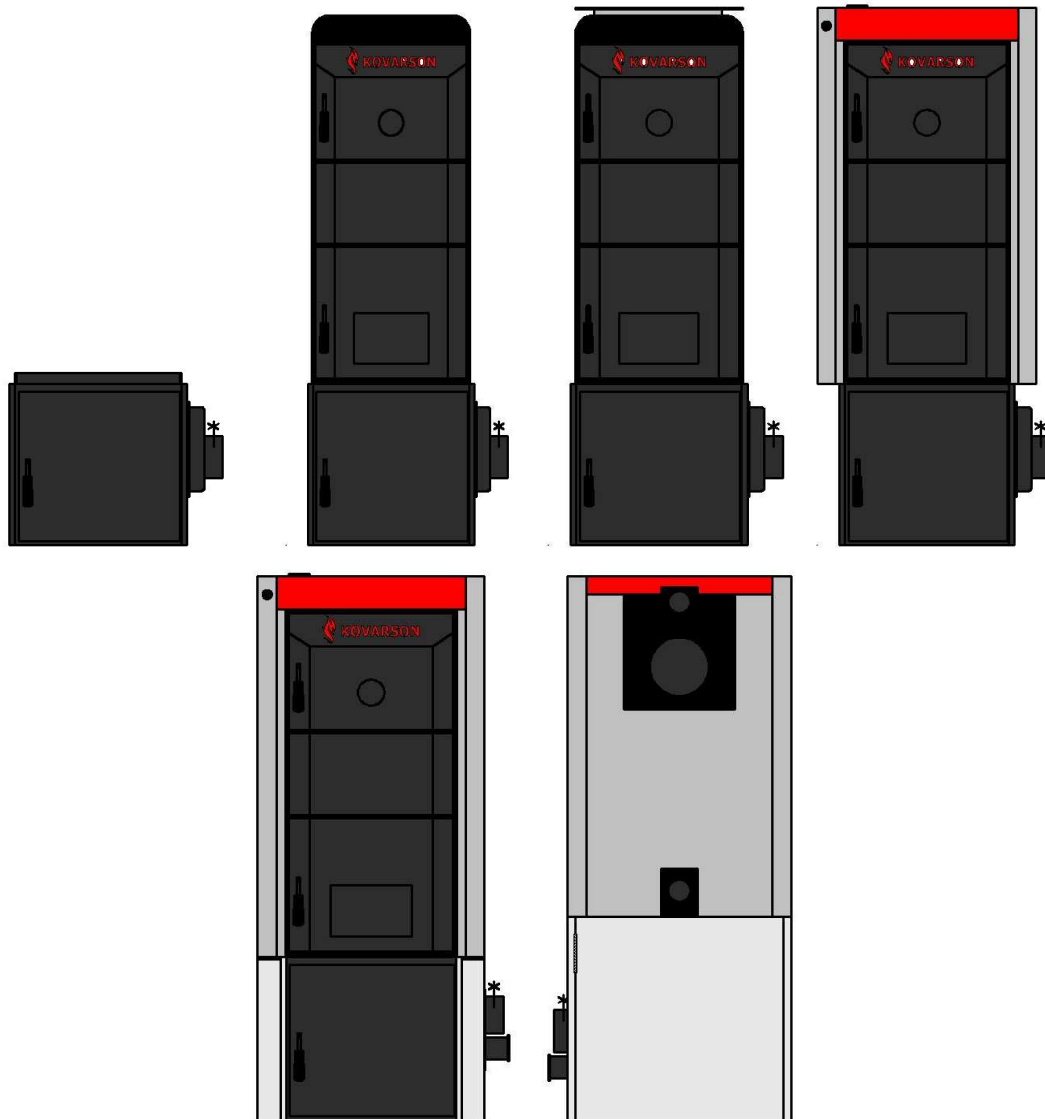


Figure 6 Boiler body casing

**Base casing:**

1. Remove the casing from the carton.
2. After screwing the burner head on, hook the side burner base casing onto the boiler casing. Add the rear of the casing and tighten the screws.

### 6.2.3 Burner Installation

1. Screwed the cast iron burner head onto the base.
2. Remove the cast iron collar from the cast iron head
3. Seal the flange burner head
4. Put the universal burner into the base without the collar and tighten the bolts
5. Use stove sealant on the collar and put it back (Figure 8)
6. Join the burner screw and shorten the leg as required. It must correspond to the red mark.

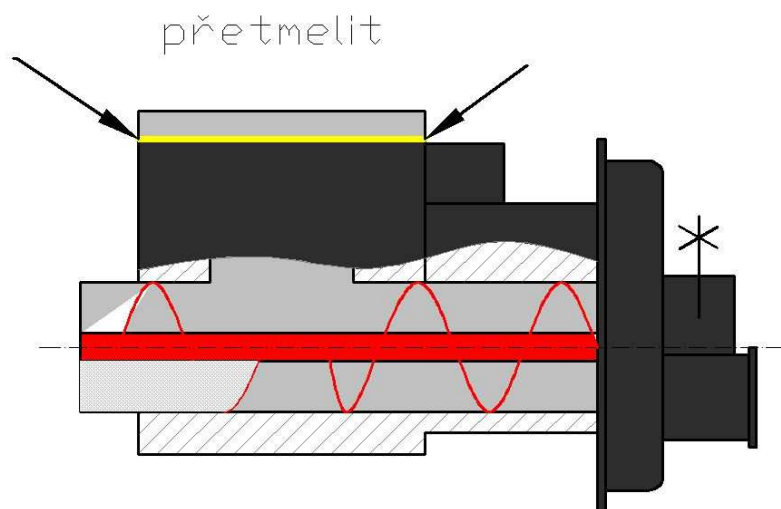


Figure 8 Sealing the top cast-iron collar and flange

### 6.2.4 Fan installation

1. Put the fan in place and bolt it on.

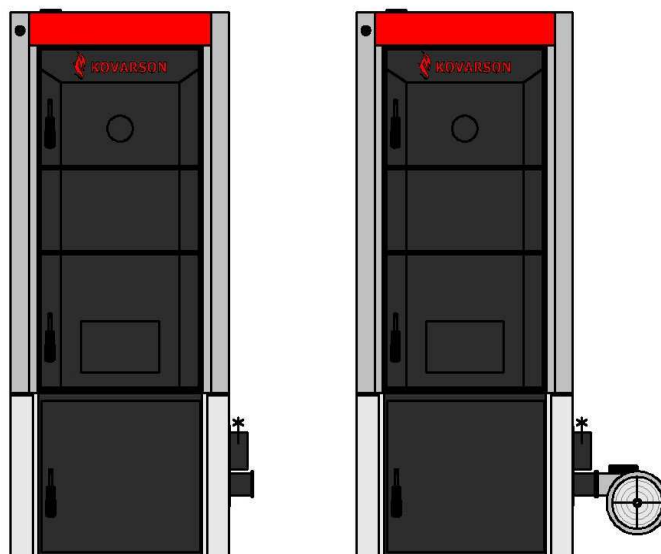


Figure 9 Fan installation

### 6.2.5 Fuel hopper installation

1. When assembling the fuel feeder to the base and to the fuel hopper, first ensure that everything is level and then final tighten the bolts.
2. Apply sealant to the fuel screw feeder where the contact surfaces of fuel hopper are to be placed. Put the fuel hopper in place and tighten the screws

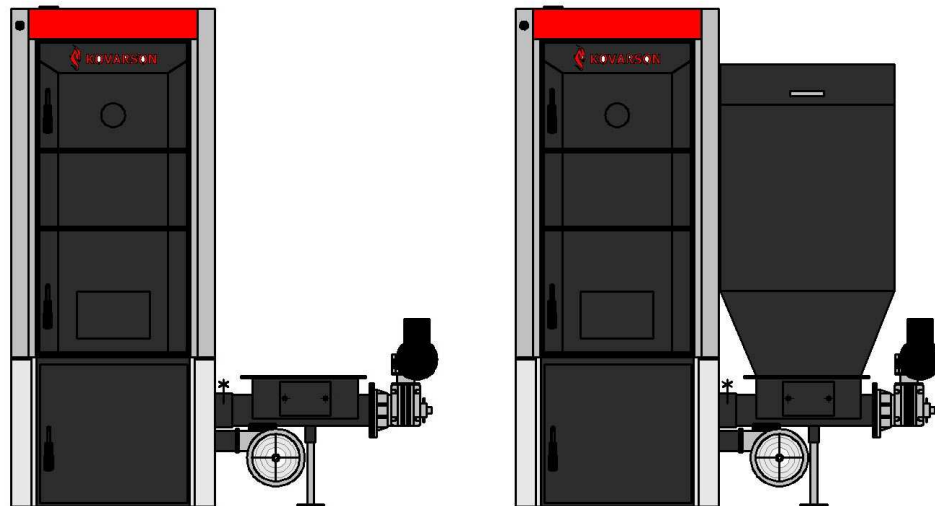


Figure 10 Fuel hopper installation

### 6.2.6 Installation of control unit and temperature sensors

1. Place the control unit on the boiler.
2. Engage temperature sensors:
  - Put the CH sensors into the reservoirs in the boiler's water output connection
  - The DHW sensor is placed into the boiler reservoir or taped directly onto the pipe (the sensor is set to OFF in the factory settings, the sensor is only used when the boiler is in use)
  - The temperature regulation sensor (an emergency thermostat) is put into a separate reservoir in the boiler's water output pipe, as close to the boiler as possible
  - The hopper temperature sensor is put into a pipe placed on the screw feeder behind the fan
3. Connect the feeder, fan and pumps according to the control unit instructions.

### 6.2.7 Installation of emergency fire safety equipment

1. Remove the silver-coloured plug from the burner.
2. Screw in the copper hose connector
3. Put one end of the hose onto the hose connector and tighten the hose clamp.
4. Cut the hose to the desired length.

5. Fasten the other end of the hose to the tank's tap nozzle and tighten the hose clamp.
6. Install the water tank in the bracket at the back side of the hopper.

## 7. Operating the boiler by the user

Only authorized heating specialists are to put the boiler into service.

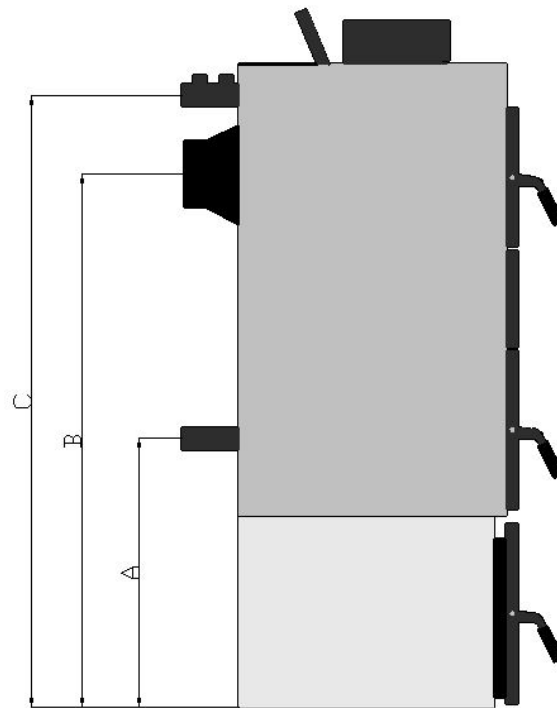


Figure12 Boiler connection dimensions

Boiler	A	B	C
4 - 7 section	620	1225	1400
8 – 10 section	720	1325	1500

### 7.1 Electrical Wiring

It is not necessary to interfere with the electrical wiring in any way when putting the boiler into operation. All the connectors are connected to the rear of the control unit; these connectors allow for quick and easy connection to, or disconnection from, the control unit.

Shorten or extend sensor cables abiding by the following recommendations:

- Do not cut the sensor cables to a length shorter than 0.5m
- We do not recommend extending the sensor cable more than 10m
- CMSM - H 2 x 0.5 mm cable is recommended for extensions
- Take care in extending cables. When shortening or extending a cable ensure there is a good connection.

## **7.2 Pre-fire-up check list**

**Before firing up the boiler the following should be checked:**

### **a) Heating system water level**

The mineral content (hardness) of the water used in the boiler must comply with ČSN 07 7401 standards and it is essential that, if the mineral content is not in compliance, the water must be softened – this is covered in Section 05.01. Heating systems with open expansion tanks allow direct contact between the water and air in the environment. During the heating season the expanding water in the tank absorbs oxygen, which hastens the effects of corrosion while allowing significant water evaporation. If more water is added, it must be treated according to ČSN 07 7401 standards.

The heating system must be thoroughly rinsed out in order to eliminate all impurities. During the heating period a constant volume of water in the heating system must be maintained. When adding water to heating system, it must be ensured that no air is drawn into the system. Water from the boiler and heating system must never be discharged or removed except in cases of emergency such as repairs etc. Draining the water and replenishing it increases the risk of corrosion and scaling. If it becomes necessary to add water to the heating system, do so only when the boiler is cold to avoid cracking.

### **b) A tight heating system**

### **c) Connecting the flue – The flue must be approved by a chimney inspector**

### **d) Burner tightness**

Connect to the power supply (insert the plug into the socket). Switch on the control unit using the main power switch, change the mode to manual feeding and start up the fan. Air must flow only into the combustion chamber in the universal burner. Focus on the following contact surfaces when performing the system check:

- Between the fan and flange
- Around the lower burner ash pit
- The cast iron grate fitting. If there appears to be leakage, remove the grate and the sealant, reapply an appropriate amount of new sealant, refit the grate and check the fitting again.
- The fan will switch off when the button is pressed.

### **e) Connection to main power supply**

Power is supplied through a flexible cable plugged into a standard 230 V/50 Hz/10 A wall socket.

### **g) Check the flue damper opening**

### 7.3 Control unit parameters setting

Tab.7 control unit set to brown coal at nominal output

	<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
Boiler model							
Number of sections	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Feeding time	12	14	6	6	6	6	5
Feeding idle time	30	25	12	7	5	20	15
Fan speed	22	30	35	39	45	28	30
Minimum speed - SERVIS	20	20	20	20	30	20	30
Maximum speed - SERVIS	52	52	52	51	55	43	43

Tab.8 control unit setting for brown coal at reduced power

	<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
Boiler model							
Number of sections	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Feeding time	5	5	6	7	7	5	5
Feeding idle time	54	48	41	34	30	68	60
Fan speed	25	26	28	31	34	10	15
Minimum speed- SERVIS	20	20	20	20	20	20	20
Maximum speed- SERVIS	36	40	45	45	45	20	20

Tab.9 Control unit setting for wood pellets at nominal heat output

	<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
Boiler model							
Number of sections	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Feeding time	6	7	8	9	12	6	5
Feeding idle time	10	9	8	6	5	14	8
Fan speed	23	28	33	38	43	28	32
Minimum speed- SERVIS	20	20	20	20	20	30	30
Maximum speed- SERVIS	51	51	51	51	51	50	50

Tab.10 Control unit setting for wood pellets at reduced power

	<b>TIGER 20</b>	<b>TIGER 25</b>	<b>TIGER 30</b>	<b>TIGER 35</b>	<b>TIGER 40</b>	<b>TIGER 48</b>	<b>TIGER 55</b>
Boiler model							
Number of sections	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
Feeding time	8	8	8	8	8	5	5
Feeding idle time	66	59	41	34	28	53	45
Fan speed	13	15	16	18	20	8	10
Minimum speed- SERVIS	21	20	20	20	20	20	20
Maximum speed- SERVIS	28	30	50	51	50	20	20

## 7.4 Putting the boiler into operation - Firing up

### 1. Firing up

- Check parameter settings - see Section 7.3
- Check the amount of water in the heating system using the manometer.
- Open the closed valves between the boiler and heating system.
- Check that the pumps are in order (i.e. are they turning?)
- Clean the burner and ash pan (not for the first firing). The ash door must be shut at all times when the boiler is being fired up and when it is in operation.
- Fill the fuel hopper with the appropriate amount of fuel. After filling the fuel hopper, close it tightly to prevent possible air intake into the burner through the feeder.
- Switch the unit on in manual mode and start feeding the feeder using the “+ button”. The fuel must be fed into the burner to approximately 1 cm below the edge. The feeder will feed the burner for approximately 7 minutes. If the motor gets too hot, the thermo-fuse will cause the feeder to stop. After cooling, the motor begins feeding again.
- The fuel should be ignited with liquid or solid fire starters, or with wood chips.
- Ignite and let it burn.
- Allow to burn for about 3 minutes, then gradually start the fan by pressing the “- button”. In the beginning, start the fan and then stop it. If the fan blows too hard in manual feeding mode, the maximum fan speed needs to be set in the service menu.
- When firing up, keep the fuel level about 2 cm below the edge of the cast iron grate.
- When the space inside burner has completely heated up, the boiler can be switched to automatic mode by pressing the ↑ button.

### 2. Recheck the tightness of the boiler.

### 3. Do a heat test.

### 4. Familiarize users with service.

### 5. Make a record in the warranty certificate.

### Checking the shape of flame (**brown coal or wood pellets**)

The shape of the flame gives indicates whether the boiler settings are correct at nominal output. It is recommended that a check be performed whenever new brown coal has been purchased. When checking the shape of the flame, make sure the boiler is set to nominal output.

**Brown coal nut 2:**



Figure13 desired flame



Figure14 poor flame

**Wood pellets:**



Figure15 desired flame



Figure16 poor flame



## 7.5 Using a thermostat to optimize performance

A *LIDER* control unit can be connected using a remote thermostat. This allows the user to access and set the boiler's settings more easily and comfortably. Constant comfort and regular heating conditions can be set in living areas. When the room is heated to the desired temperature, the control unit switches to MONITORING mode, whose primary function is to switch the circulation pump off for 25 seconds during which time the THERMOSTAT LED is on. If the boiler is in MONITORING mode (i.e. the fuel feeder and fan are off) and the temperature in the boiler reaches 80°C due to an idle circulation pump, the *LIDER* control unit starts the pump up regardless of the thermostat's signals (i.e. the *LIDER* control unit will override the thermostat signal). This helps to ensure that the boiler does not overheat.

However, if the temperature in the boiler falls below the minimum operating temperature in the service setting, which is 40°C, the unit switches from MONITORING mode to REGULATION mode and the boiler heats up back to the desired minimum temperature with circulation pump off. When the thermostat detects that the room temperature has decreased and needs to heat back up, the control unit will switch back to REGULATION mode, the circulation pump will start up and the boiler will heat the room to the thermostat setting.

Thermostats can be connected using a 2-wire cable according to the control unit's operation and installation instructions. The *LIDER* control unit comes with a cinch-type connector. The on-off switch in the thermostat communicates sends signals to the *LIDER* control unit. No signal is sent when the desired room temperature is higher than the temperature in the room. A signal is sent the moment the room temperature dips to the temperature that has been set.

A wired or wireless thermostat can be used to regulate room temperatures.

## 8. Important instructions

- The boiler can be used only for the purposes for which it is designed.
- The boiler may only be operated by adults familiar with these operating instructions. Do not leave children unattended near the boiler when it is in operation.
- The boiler is not intended for unsupervised use by children, by persons with reduced physical, sensory or mental capabilities, or by those who lack the experience or knowledge to the appliance safely, unless these persons have been adequately instructed how use the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- If there is a risk that flammable vapours or gasses may enter the boiler room, or if there is work being done during which there is a temporary risk of fire or explosion (e.g. gluing floor coverings, painting with flammable paints, etc.), the boiler must be shut down before beginning the operation. When fuel is being fed into the combustion chamber before firing up, it should be checked visually – do not insert hands into the firebox. There is a risk of injury caused by the rotating the feeding screw.
- Do not use flammable liquids (gasoline, alcohol, etc.) when heating up the TIGER boiler. It is FORBIDDEN to overheat the boiler in any way during operation.
- Do not place flammable objects closer than the safe distance to the boiler. When removing the ashes from the boiler a minimum distance 1500 mm must be maintained for all flammable substances. The ashes must be disposed of in a non-combustible container with a lid. Wear protective equipment.
- After the heating season the boiler should be thoroughly cleaned, including the flue pipe. The boiler room must be kept clean and dry.
- Do not tamper with the boiler construction or electric components.
- A relief valve must be installed to the maximum overpressure of ..... kPa - the value must match the boiler's nominal output. If you have any questions, please contact our installation partners or service agents.
- Poor fuel quality can significantly affect the performance and emission parameters of the boiler.
- The rules and regulations of the applicable region must be adhered to during assembly, installation and operation of the appliance. If these conditions are not met, the warranty is void.
- By Czech Government regulation 91/2010 Sb. pertaining to fire safety for chimneys, flues and fuel burners, the operator is obliged to undertake regular cleaning and inspections.

## 9. Maintenance

1. Ensure that the fuel hopper is constantly refilled. If the fuel level is too low, refill the hopper. When adding fuel or checking the fuel level be sure to cover the hopper tightly!
2. If the boiler is correctly adjusted the fuel is burned up by the time it reaches the edge of the grate. The ashes then drop into the ash pan. On average, the ash pan needs to be emptied every second day (use protective gloves when handling the ash pan). Occasionally pieces of cinder need to be removed from around the edge of the grate. Use the poker to do this.
3. When in continuous operation, it is recommended to clean the inner surfaces of the boiler body twice a month (If not cleaned, heat transfer surfaces are adversely affected, which can have a significant negative impact on the boiler's heat transfer efficiency).
4. The air intake mixer should be cleaned every 3 months. The mixer has an influence on the correct airflow.
5. If a hard object gets stuck in the feeder screw causing the shear fuse to go, replace the fuse. Clean the unwanted material from the screw through the hopper cleaning opening and use a 19 mm wrench to rotate the screw. Then install a new fuse and put the burner back into operation.

**WARNING: Before performing this operation, make sure the boiler is disconnected from the power supply (the plug is removed from the socket) and fuel is cooled to avoid a back-burn.**

6. There is a small amount of overpressure in the boiler because of the fan and, therefore, it is necessary to ensure that the boiler is air-tight (e.g. the cleaning doors, middle door, ash door, burner cleaning opening, fuel hopper cover, etc.). Fuel hopper tightness achieved when the lid is properly shut and latched provided that the surfaces of the rubber seal are undamaged. If the fuel hopper seal is damaged, replace it.
7. In the event of a power failure, the wax cap acts as a safeguard against back-burn and extinguishes burning fuel. Always keep the tank filled with water.
8. Clean the inside of the combustion chamber, the smoke outlets and fittings once a month. Do not clean the boiler unless it is cooler than 40°C. Use the cleaning hatch in the bottom to remove the ash from the flue fitting. Ensure that it is airtight after cleaning.

## **10. Disposal of the product after its life cycle**

Packaging should be disposed of as follows:

- plastic wrappings, cardboard packaging can be discarded at a waste facility
- metal strapping can be discarded at a waste facility
- the wooden base is intended for a single use must be discarded. The disposal of the base is subject to Act 94/2004 Coll. and 185/2001 Coll. as amended.

Because the boiler is manufactured from common metals, dispose of the individual parts as follows:

- mixer (gray cast iron) can be discarded at a waste facility
- piping, shell can be discarded at a waste facility
- other metal parts can be discarded at a waste facility

## **11. Guarantee and liability for defects**

**The company provides the following guarantee:**

The boiler is guaranteed for a period of 24 months from the date it is put into operation.

For claims pertaining to the casing, the customer must submit the boiler casing packaging label. It is located on the carton in which the casing is shipped.

The user must have a professional assembly service company put the boiler into operation and service the equipment, otherwise proper functioning cannot be guaranteed. A completed "certification of quality and completeness of the TIGER boiler" document can be used as a "Certificate of warranty". The user is obliged to have the boiler undergo regular maintenance.

Defects should be reported immediately after detection in writing and by telephone. Failure to follow these instructions will void the manufacturer's warranty.

The manufacturer reserves the right to make changes related to product innovations that may not be included in this manual.

**The warranty does not cover:**

- defects caused by improper assembly, improper handling or defects caused by improper maintenance (more in Section 8)
- product damaged during transport or other mechanical damage
- defects caused by improper storage
- defects caused by failure to observe water quality guidelines for the heating system (more in Section 5.1 and 7.2) or through the use of anti-freeze
- defects caused by not following the instructions provided in this manual.
- failures caused by operating the boiler on non-warranted fuel (see Tab. 3 and 4)

## 12. Trouble shooting

Issue	Possible cause	Resolution
<b>control unit cannot be turned on</b>	- no voltage in the network	- check the power network
	- plug incorrectly inserted in the wall socket	- check the socket connection
	- defective control unit	- replace the unit
	- damage to the power cord	- replace the cord
	- LED indicators do not light up	- replace damaged fuse
<b>boiler does not reach the required parameters</b>	- low water level in the heating system	- refill
	- pump output too high	- adjust the flow rate and pump switching
	- Power output too low for the system	- poorly prepared project
	- poor quality fuel	- check and heating value and quality of materials from suppliers
	- insufficient draft	- new chimney, or correct improper connection
	- excess flue draft	- install a damper in the flue
- inadequately cleaned boiler	- clean the boiler	
<b>Door leaks smoke</b>	- improperly adjusted door hinges	- tighten the hinge screws
	- faulty sealing cord	- replace the cord
<b>Fan wobbles or is noisy</b>	- overheated boiler - temperature limiter activation (an emergency thermostat)	- wait until temperature drops to approximately 70°C, then press the temperature limiter placed on the control unit
	- inoperable motor	- replace the motor
	- Damage to the power cord	- replace the cord
<b>Alarm activation</b>	- Alarm 5	- shortage of fuel - improper adjustment of fuel delivery unit
	- alarm sensors	- determine which sensor is damaged and contact service
<b>Smoke in the boiler room</b>	- leaky door	- replace the sealing cord - Tighten the hinge screws
	- Failure to set the burner	- if boiler smokes, reduce the amount fuel being fed or increase fan speed

## EC DECLARATION OF CONFORMITY

by Directive of the European Parliament and of the Council 2006/42/ES (Government Regulation No. 176/2008 Sb.)

by Directive of the European Parliament and of the Council 2006/95/ES (Government Regulation No. 17/2003 Sb.)

by Directive of the European Parliament and of the Council 2004/108/ES (Government Regulation No. 616/2006 Sb.)

**Producer :** KOVARSON s.r.o. Lhota u Vsetína 4, 755 01

**Device:** An automatic boiler for burning brown coal or wood pellets

**type code:** TIGER 20, TIGER 25, TIGER 30, TIGER 35, TIGER 40, TIGER 48, TIGER 55

Description of the device:

**Automatic cast iron boiler with fuel feeder and fuel hopper. Brown coal "nut 2" or wood pellets used as fuel.**

meets the requirements of:

Directive 2006/42/ES (Government Regulation No.176/2008 Sb.)

Directive 2006/95/ES (Government Regulation No.17/2003 Sb.)

Directive 2004/108/ES (Government Regulation No.616/2006 Sb.)

### List of other technical standards and regulations:

ČSN EN 303-5:2000, ČSN 06 1008:1997, ČSN EN 60335-1:2003 ed. 2, ČSN EN 60335-2-102:2007, ČSN EN 55014-1:2007 ed.3, ČSN EN 61000-6-3:2007 ed.2, ČSN EN 61000-3-2:2006 ed.3, ČSN EN 61000-3-3:2009 ed. 2, ČSN EN 55014-2:1998, ČSN EN 62233:2008, ČSN EN ISO 2100:2011, ČSN EN 953+A1:2009, ČSN EN ISO 11202:2010, ČSN EN ISO 3746:2011  
ČSN ISO/TR 9172, ČSN ISO 1819:1993

### Person responsible for assembling the technical documentation:

Ing. Jan Valčík

### Person authorized to draw up the original EC declaration of conformity:

Bc. Jaroslav Kovář


**The manufacturer declares that the equipment fulfills all the relevant provisions of the present regulations of the European Community.**

**This declaration of conformity is the original EC declaration of conformity.**

**The last two digits of the year in which the CE marking was affixed: 10**

In Vsetíně day 10.10.2012

.....  
Person responsible for the preparation  
original EC declaration of conformity

 **KOVARSON s.r.o.**  
zapsaná v OR u KS v Brně, oddíl C, číslo 66816  
Lhota u Vsetína 4, 755 01 Vsetín  
Tel.: +420 722 925 292, E-mail: info@kovarson.cz  
IČ: 29220327, DIČ: CZ29220327

.....  
authorize the signatory on behalf of the  
manufacturer, or authorized representative



KOVARSON s.r.o.  
Lhota u Vsetína 4  
755 01, Vsetín  
Tel. ČR: +420 571 420 926  
Tel. SR: +421 949 176 717  
Email: [info@kovarson.cz](mailto:info@kovarson.cz)

