

Bottom Blowdown Controller

# BK 4000

---

## Installation and Operating Instructions

EN

English

# CONTENT

<b>1.SAFETY INFORMATION .....</b>	<b>II</b>
<b>2.GENERAL INFORMATION.....</b>	<b>1</b>
2.1 Description .....	1
2.2 Approvals .....	2
<b>3.TECHNICAL SPESIFICATONS .....</b>	<b>2</b>
<b>4.INSTALLATION AND WIRING .....</b>	<b>3</b>
4.1 Installation .....	3
4.2 Wiring .....	3
<b>5.COMMISSIONING .....</b>	<b>4</b>
<b>6.FUNCTIONS and CONFIGURATIONS.....</b>	<b>4</b>
6.1 Display Definitons and Button Functions .....	4
6.2 Changing Function Configurations .....	5
6.2.1. Startup Screen.....	5
6.2.2. Password.....	5
6.2.3. Interval.....	6
6.2.4. Blowdown .....	6
6.2.5. Reset .....	7
6.2.6. Sys O/C .....	7
6.2.7. Test .....	8
6.2.8. Pass Chg .....	8
6.2.9. BL.S.RST .....	9
6.2.10. ALRM RST .....	9
6.2.11. Alarm Situations .....	10
6.2.12. Monitoring the Set Values .....	11
<b>7.MAINTANANCE .....</b>	<b>12</b>

## 1. SAFETY INFORMATION

Installation, commissioning and maintenance of this device must be done by a qualified personnel in compliance with the operating instructions. Otherwise device and related equipments may be damaged and personnel may be injured. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

National and local regulations must be taken into consideration.



### **Warning!**

Please make sure to remove the main supply before installation. Otherwise this may cause damage to the product, personal injuries or even death

### **1.1 Tools**

Before starting work, make sure that you have suitable tools and consumables available.

### **1.2 Temperature**

Let the temperature to cool down after isolation to avoid danger of burns.

### **1.3 Freezing**

Required precautions must be taken at the places where they may be exposed to temperatures below freezing point.

### **1.4 Lighting**

Make sure there is enough lighting, particularly where detailed or tough work is required.

### **1.5 Pressure**

Make sure that any pressure is isolated and safely vented to atmospheric pressure. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

### **1.6 Access**

Before attempting to work on the product, safe Access must be ensured. If necessary, lifting gear should be used.

### **1.7 Residual hazards**

The external surface of the product may be very hot. If used at the maximum operating conditions according to the specs, the surface temperature of some products may reach temperatures of 239°C.

### **1.8 Hazardous environment**

Plant rooms are usually explosion risk areas. There may be lack of oxygen, dangerous gases extremes of temperature, hot surfaces, fire hazard excessive noise, moving machinery.

### **1.9 Suitable protective clothing**

In order to be protected against the hazards of chemicals, high temperature, radiation, noise, falling objects, and dangers to eyes and face, anyone around requires protective clothing suitable in the plant room.

### **1.10 Hazardous liquids or gases**

Be aware of that it cannot be known what may have been in the pipeline at previous usage. Consider: flammable materials, substances hazardous to health, extremes of temperature.

### **1.11 Supervision**

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Operation Instructions.

### **1.12 Disposal**

Unless otherwise stated in the Installation and Operation Instructions, this product is recyclable and no ecological hazard.

### **1.13 Returning products**

When returning products to Vira Isı ve Endüstriyel Ürünler A.Ş the customers must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

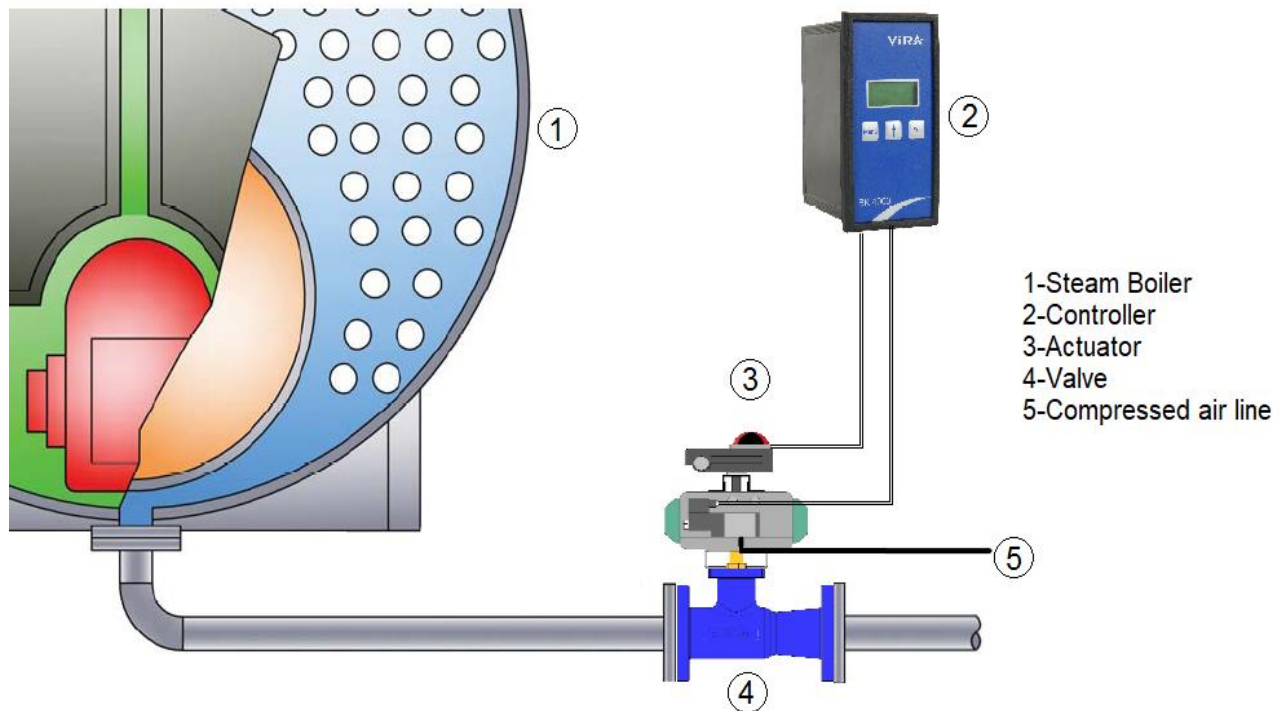
## 2.GENERAL INFORMATION

### 2.1 Description

Some impurities and salts (rust, oil and dirt that may come from the installation) precipitate to the bottom of the boiler to form a sludge layer. Thus, the heat transfer capability of the boiler is reduced and there is a danger of corrosion in the boiler. These foreign substances and salts should be periodically disposed out of the boiler to prevent the formation of the settling layer. For this, Automatic Bottom Blowdown Systems are used.

Automatic Bottom Blowdown system provides key operated manual control and full automatic control. It prevents waste of water and boiler water chemicals, therefore fuel and energy losses because of too much blowdown. Blowdown can be performed at desired ranges and times.

The Bottom Blowdown Valve BKV 4000 opens in response to a signal from the Bottom Blowdown Controller BK 4000 according to determined frequency and duration of the blowdown.



**Figure 1:** Connection of Bottom Blowdown System DB2 to a steam boiler

The BK4000 is a controller of a bottom blowdown valve. It allows the bottom blowdown valve to open, removing precipitated solids that could otherwise build up and eventually cause damage.

The BK4000 can be panel, DIN rail or chassis mounted and is powered by a 220/230 Vac at 50 / 60Hz mains supply. The front panel has an LCD graphic display and three-button keypad.

## 2.2 Approvals

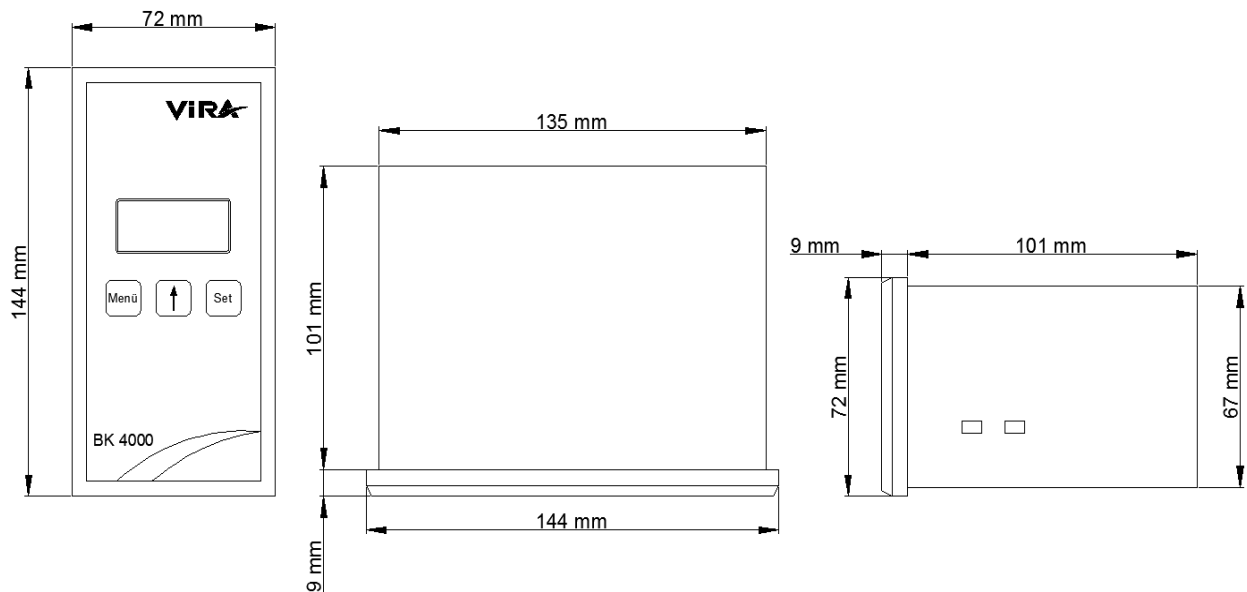
The BK4000 complies with Electromagnetic Compatibility Directive and all its requirements. This product is suitable for industrial environments. A fully detailed EMC assessment has been made and has the reference number A 0442 21141 00 EY.

The BK4000 complies with the Low Voltage Directive (2014/35/EU) by meeting the standards of:

- EN 61010-1: 2010 safety requirements for electrical equipment for measurement, control, and laboratory use.

## 3. TECHNICAL SPECIFICATIONS

<b>Enclosure</b>	: IP 54
<b>Maximum ambient temperature</b>	: 55 °C
<b>Main supply voltage</b>	: 220/230 Vac
<b>Frequency</b>	: 50/60 Hz
<b>Maximum power consumption</b>	: 3 VA
<b>Dimensions (height x depth x width)</b>	: 144 x 110 x 72 mm
<b>Weight</b>	: 0.5 kg

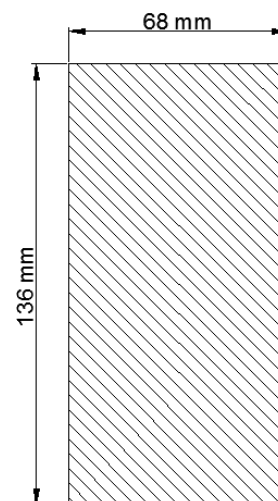


**Figure 2:** Case dimensions of Bottom Blowdown Controller BK 4000

## 4. INSTALLATION AND WIRING

### 4.1 Installation

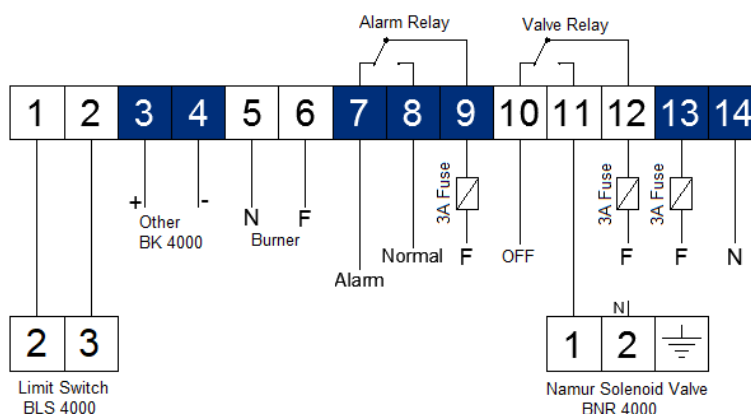
Bottom Blowdown Controller BK 4000 is front panel mounting enclosure type and can be applied to the front panel with two screw clamps supplied. Allow 20 mm minimum clearance all round the unit for air circulation.



**Figure 3:** Panel cut out dimensions of Bottom Blowdown Controller

### 4.2 Wiring

Wiring between controller and namur solenoid valve, 3x1 mm<sup>2</sup> normal cable can be used. Wiring between controller and limit switch, 2x1 mm<sup>2</sup> normal cable can be used.



**Figure 4:** Bottom Blowdown Controller BK 4000 electrical wiring diagram

**Limit Switch:** Limit switch gives “valve opened” and “valve closed” signals to BK 4000.

**Other BK 4000s:** This function prevents blowdowns that happening at the same time to common blowdown line.

**Burner:** With this function BK 4000 do not blowdown while burner is operating.

**Alarm:** While blowdown, if valve is not opened or not closed properly, BK 4000 gives alarm relay output.

**Namur Solenoid Valve:** It opens and closes the valve using the signals sent from BK 4000.



### Warning!

At the all phase inputs of the controller, must be used 3A fuse (non-delay type).

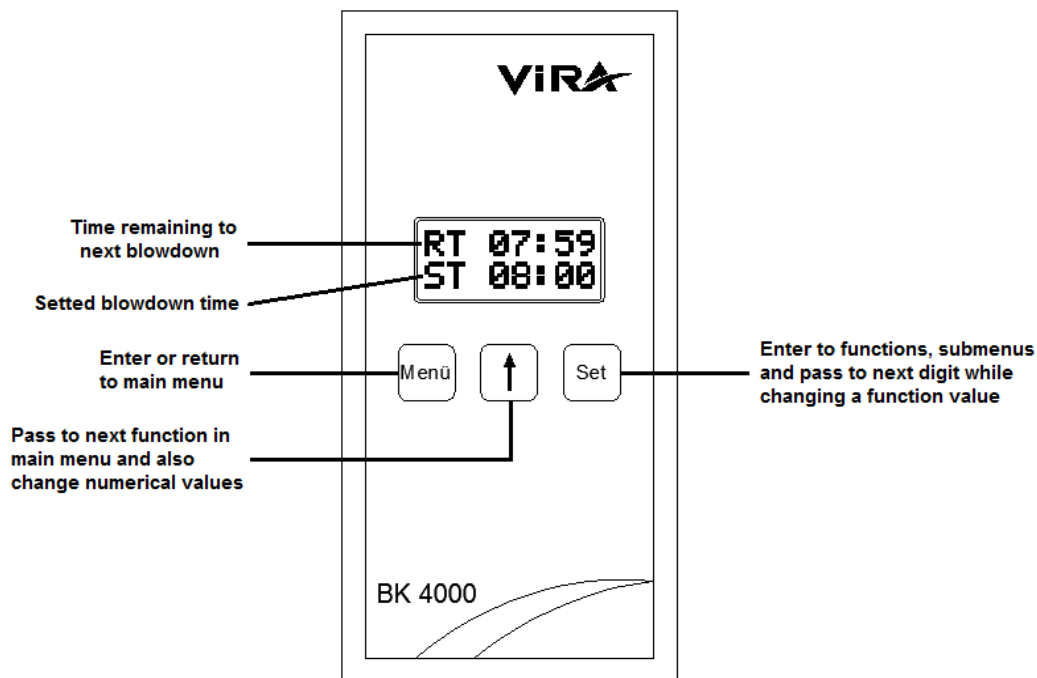
For wiring and installation of BKV 4000 Bottom Blowdown Valve, please refer to “BKV 4000 Bottom Blowdown Valve Installation and Operating Instructions”.

## 5. COMMISSIONING

- Be sure that all phase and neutral ends are connected to the right terminals.
- Be sure that all function values are adjusted correctly.
- Check alarm function and valve open function from TEST menu and be sure they are working correctly.

## 6. FUNCTIONS and CONFIGURATIONS

### 6.1 Display Definitions and Button Functions



**Figure 5:** Definitions and Button Functions



button is used to enter main menu or return to main menu.



button is used to pass to next function in main menu and also is used to change the numerical values.



button is used to enter to functions, submenus and to pass the next digit while changing a functions value.





Figure 6: The main screen of BK 4000



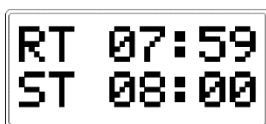
Figure 7: Example screen image of a function menu

The screen seen above on the left is the main screen of BK 4000. On display, upper row shows the remaining time to next blowdown and lower row shows the time between two blowdowns. The display format is Hour: Minute.

To access the main menu, press and hold button during 3 seconds. button is used to pass to next function while on main menu. To enter a function button is used. When enter a function, button is used to change digits. To pass the next digit button is used. To accept the changed function value, press button after the last digit is changed. To return to main menu without saving the changed function value, button is used.

## 6.2 Changing Function Configurations

### 6.2.1 Startup Screen ( RT: Remaining Time, ST: Set Time)



When device is powered, the screen likes the figure on the left. To enter the main menu, press and hold button during 3 seconds.

### 6.2.2 Password




To obstruct unauthorized interferences, BK 4000 has password protection. button changes each digit and button passes the next digit. After change the last digit, button accepts the password and if it is true, it automatically enters the main menu.


### 6.2.3 Interval







This function is used to adjust the time between two blowdowns.

Press  button to enter to function menu.



Lower row numbers show the blowdown interval time that adjusted previously. Time format is Hour : Minute. 



 button changes each digit and  button passes the next digit. After change the last digit,  button accepts the whole value and returns to main

menu without saving the changed function value,  button is used.


### 6.2.4 Blowdown







The function is used to adjust the duration of each blowdown.

Press  button to enter the function menu. Press  button to enter to function menu.



Lower row number shows the blowdown duration that adjusted previously. Time format is seconds. 


 button changes each digit and  button passes the next digit. After change the last digit,  button accepts the whole value and returns to main menu. To return to main menu without saving

the changed function value,  button is used.

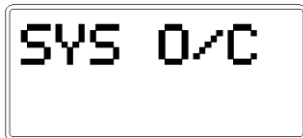
### 6.2.5 Reset




This function is used to reset time between two blowdowns.

Then time starts from the beginning. To reset time, press  button while on RESET function.


### 6.2.6 Sys O/C (System OPEN/CLOSE)



This function is used to activate or deactivate the system.

Press  button to enter to function menu.

Buttons and related actions are shown below.

 (MN) Save changes and return to main menu.

 (SO – SYS.OPEN) System is opened.

 (SC – SYS.CLOS) System is closed.



**Note:** Be sure that “SYS.OPEN” (system is opened) is selected when commissioning.

MN-SO-SC  
SYS.CLOS



UiraVALF  
SYS.CLOS




If “SYS.CLOS – system is closed” is selected, main screen of BK 4000 is changed like in figure on the left and blowdown system do not work until “SYS.OPEN – system open” is selected.

### 6.2.7 Test

TEST




This function is used to test the Bottom Blowdown Control Valve BKV 4000 and the alarm function working properly.

Press  button to enter to function menu.


Buttons and related actions are shown below.

TEST  
MN-AL-VL



 (MN) Save changes and return to main menu.

 (AL) Make alarm test.


 (VL) Open the valve during 5 seconds.

### 6.2.8 Pass Chg (Password Change)

PASS CHG



This function is used to change the password of the device.

Press  button to enter to function menu.

PASS CHG  
00



↑ button changes each digit and Set button passes the next digit. After change the last digit, Set button accepts the whole value and returns to main menu. To return to main menu without saving the changed function value, Menu button is used.

Default password	00
Changed password	

**Note:** Please note the new password above or somewhere you want.

### 6.2.9 BL.C.RST (Blowdown Counter Reset)

BL.C.RST



It is used to reset the blowdown counter. To reset the blowdown counter, press Set button while on BL.C.RST function.

### 6.2.10 ALRM RST (Alarm Reset)

ALRM RST



When controller gives “VALVCLOS – valve is closed” alarm, even though alarm situation ends VALVCLOS warning still indicates at lower line of the screen. To remove the VALVCLOS warning from the screen, ALRM RST function is used. While on ALRM RST function, press Set button to remove the VALVCLOS warning and normalize the main screen.

## 6.2.11 Alarm Situations



ALARM  
VALVOPEN



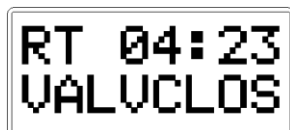
If the BKV 4000 Bottom Blowdown Valve is opened for any reason before the time for blowdown, this alarm occurs. The controller gives “VALVOPEN – valve is OPEN” alarm and main screen changes like in figure on the left. During the alarm situation, the controller pauses the blowdown time. When the alarm situation is ended, blowdown time resumes, not starts from the beginning.



ALARM  
VALVCLOS



If the BKV 4000 Bottom Blowdown Valve is not opened when blowdown time comes, the controller gives “VALVCLOS – valve is closed” alarm and main screen changes like in figure on the left. During the alarm situation, the controller pauses the blowdown time. When the alarm situation is ended, blowdown time resumes, not starts from the beginning.





RT 04:23  
VALVCLOS



After alarm situation is ended VALVCLOS warning still indicates for the informational purpose at the lower line of the screen like in figure on the left. To normalize the main screen, ALRM RST function is used.

## 6.2.12 Monitoring the Set Values

It is possible to monitor the set values without enter to function menus. While on main screen, pressing and holding  button for 1 second is displayed the monitoring menu. After entering the monitoring menu,  button is used to display next set value.

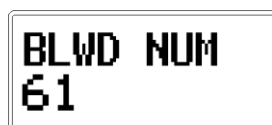


BLOWDOWN  
05 s

Menü  Set

### **BLOWDOWN**

It shows the duration of each blowdown.



BLWD NUM  
61

Menü  Set

### **BLWD NUM (Blowdown counter)**

BK 4000 counts the blowdowns and number of blowdowns since last reset of blowdown counter is shown here. To reset blowdown timer, BL.C.RST function is used.



INTERVAL  
08:00

Menü  Set

### **INTERVAL**

It shows the time between two blowdowns.

## 7. MAINTENANCE



### **Warning!**

Please make sure to remove the main supply before detach the device. Otherwise this may cause damage to the product, personal injuries or even death.

When any fault situation occurs or maintenance is necessary, please contact with “**Vira Isı Service Department**”.

## **Vira Isı ve Endüstriyel Ürünler A.Ş.**

Metal İş Sanayi Sitesi 11. Blok No: 37-39

İkitelli / İSTANBUL

Tel : 0 212 549 57 70

Fax : 0 212 549 48 58

E-mail : [info@viraisi.com](mailto:info@viraisi.com)

: [servis@viraisi.com](mailto:servis@viraisi.com)

Web : [www.viraisi.com](http://www.viraisi.com)