

Self Monitoring Level Alarm Controller

# SMIK 1000

---

## Installation and Operating Instructions

EN

English

# CONTENT

<b>1.SAFETY INFORMATIONS</b> .....	<b>II</b>
<b>2.GENERAL INFORMATIONS</b> .....	<b>1</b>
2.1 Description .....	1
2.2 Approvals .....	2
<b>3.TECHNICAL SPESIFICATIONS</b> .....	<b>3</b>
<b>4.INSTALLATION and WIRING</b> .....	<b>3</b>
4.1 Installation .....	3
4.2 Wiring.....	4
4.2.1 Probe Wiring .....	4
4.2.2 Output Relays Wiring .....	5
<b>5.COMMISSIONING</b> .....	<b>6</b>
<b>6.FAULT FINDING</b> .....	<b>7</b>
<b>7.MAINTANANCE</b> .....	<b>8</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 General Safety Instructions**

#### **1.1.1 Tools**

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

#### **1.1.2 Temperature**

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

#### **1.1.3 Freezing**

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

#### **1.1.4 Lighting**

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

#### **1.1.5 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.

#### **1.1.6 Access**

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

#### **1.1.7 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.

#### **1.1.8 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.

### **1.1.9 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.

### **1.1.10 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.

### **1.1.11 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.

### **1.1.12 Disposal**

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

### **1.1.13 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.

## **1.2 Limitations of Use**

This device shall only be used in accordance with the details in these operating instructions.

The safety of the whole boiler system into which this device is mounted lies in the responsibility of the installer of the system.

If the device is applied incorrectly, the function expected from this device may be impaired.

## **1.3 Avoidance of Risks to Persons and Property**

Only use the device in accordance with the intended planning.

Do not carry out extensions and modifications to the device without Vira approval.

Observe accident prevention regulations and specific safety instructions.

The device must only be fitted and put into operation by appropriate trained persons.

## **1.4 Avoidance of Risks and Damage**

This device must not be used in areas at risk of explosion.

Avoid knocks and putting down heavily, this can lead to damage when transporting.

For storage ensure that the storage location is suitable for the device.

Read and observe the assembly and operating instructions carefully and keep them in a safe place for further usage.

## 2.GENERAL INFORMATION

### 2.1 Description

As steam is generated, the water in the boiler evaporates, and the boiler must be refilled by a make up water to maintain the level by a feedpump. Not to harm boiler and to make it working efficiently, water must be maintained at the correct level.

Safety has also vital importance. If the boiler operates with insufficient water, there is always the risk of explosion, more severe than a bomb. There is also a risk of water carryover in case of a high water level which is not desired in terms of steam dryness and efficiency. Water carryover can damage the valves, steam traps and other materials used in the steam line by water-hammer.

For this reason, level alarm (limiter) system is required to limit the water level by detecting if the low or high water level is reached, and take required action like sounding an alarm, shutting down the feedwater pump and burner. Besides, there must be at least one external transparent level indication like level gauges to see the water level directly.

The controller is used for monitoring the minimum water level in the boiler drum. If the water level falls below the minimum water level, the controller shut off the burner. Thus, overheating is prevented and the boiler is kept safe.

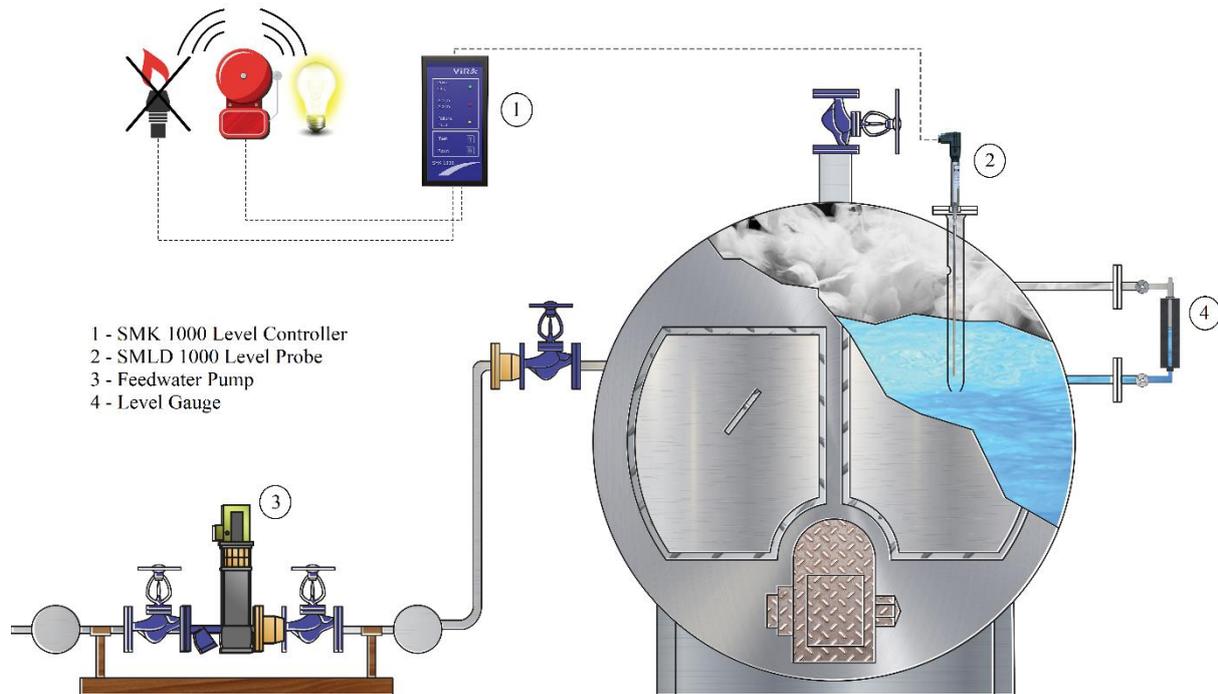
The controller is also used for monitoring the maximum water level in the boiler drum. If the water level rises above the maximum water level, the controller shut off the pump. Thus, water carryover is prevented and the products used in the steam line are kept safe and the steam remains to be dry.

Since there is a self-monitoring function, system checks itself permanently. Thus, safety is ensured.

Vira SMK 1000 Self Monitoring Level Alarm Controller can be used with the probes SMLD 1000 Self Monitoring Low Level Alarm Probe and SMHD 1000 Self Monitoring High Level Alarm probe which are mounted in the boiler or water level tube.

SMH 1000 and SML 1000 Self Monitoring Level Alarm Systems can be used with steam boiler systems without constant supervision, as well as the steam boiler systems with limited supervision.

The SMK 1000 Self Monitoring Level Alarm operates on conductivity principle for controlling the level in conductive liquids. The Level Controller with Probes are suitable for use with different qualities of liquids such as water, condensate and boiler water. SMK 1000 Self Monitoring Level Alarm Systems can be used in water with an electrical conductivity as low as 10  $\mu\text{S}/\text{cm}$  at 25 °C.



**Figure 1:** Self monitoring Low Level Alarm System Application to a Steam Boiler

## 2.2 Approvals

The SMK 1000 complies with Electromagnetic Compatibility Directive and all its requirements. This product is suitable for industrial environments according to detailed EMC assessment.

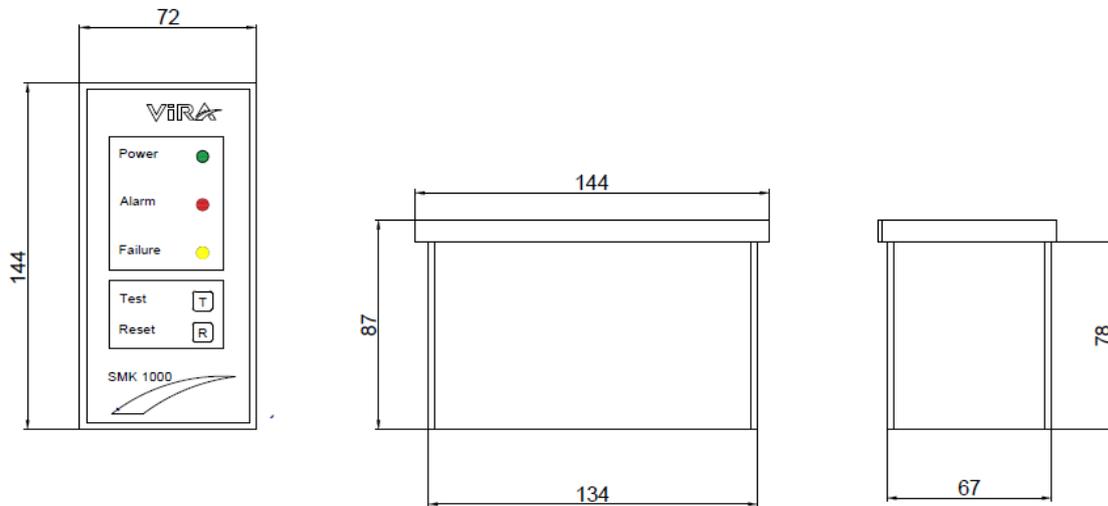
In conjunction with the appropriate VIRA level probes SMLD 1000 and SMHD 1000, the SMK 1000 self-monitoring high-low water level limiter is a 'limiter with safety function' in accordance with 2014/68/EU Directive, EN 12952-11, EN 12953-9,

The SMK 1000 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>Maximum wire length</b>	: 100 m (Controller to probe)
<b>Main supply voltage</b>	: 230Vac (+5% / -10%)
<b>Frequency</b>	: 50/60 Hz
<b>Dimensions (height x depth x width)</b>	: 144 x 87 x 72 mm
<b>Weight</b>	: 0.5 kg

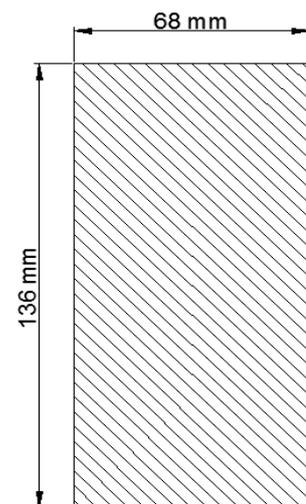


**Figure 2:** Self Monitoring Level Alarm Controller SMK 1000 Case Dimensions

### 4. INSTALLATION AND WIRING

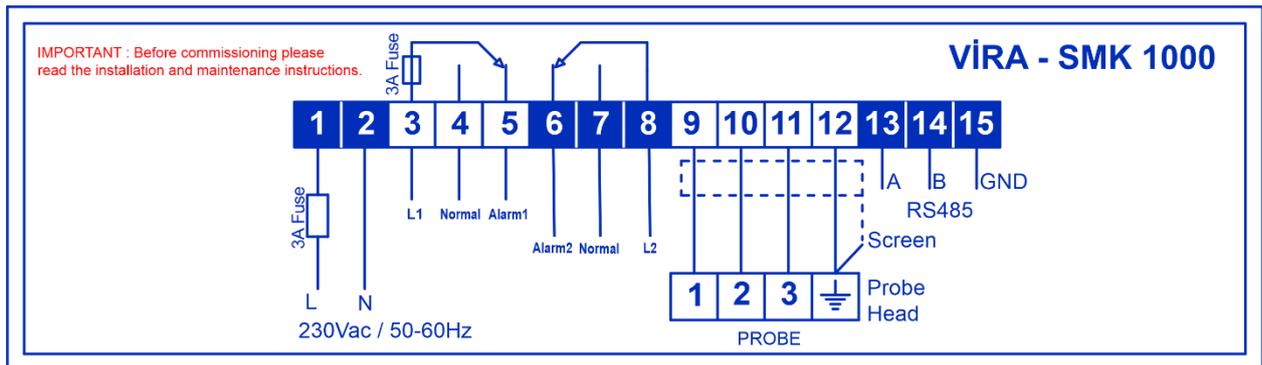
#### 4.1 Installation

SMK 1000 Self Monitoring Level Alarm Controller 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 SMK 1000 Self Monitoring Level Alarm Controller

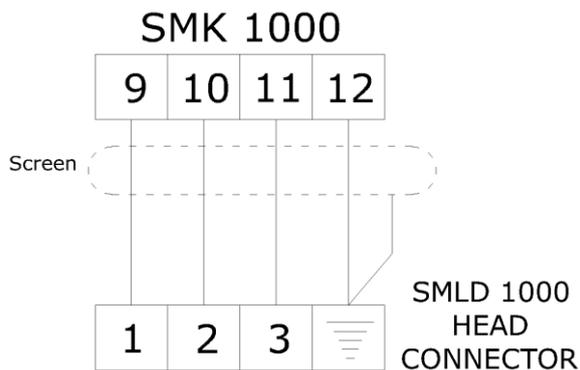
## 4.2 Wiring



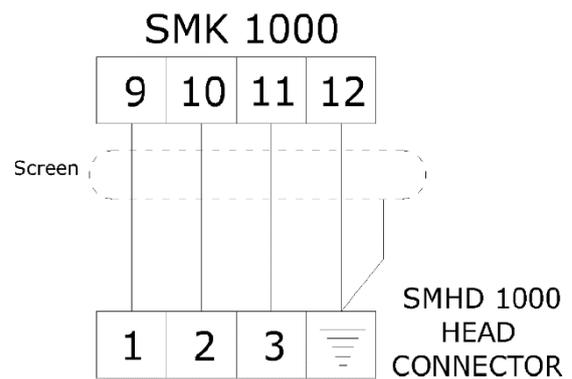
**Figure 4:** SMK 1000 Self Monitoring Level Alarm Controller Electrical Wiring Diagram Label

### 4.2.1 Probe Wiring:

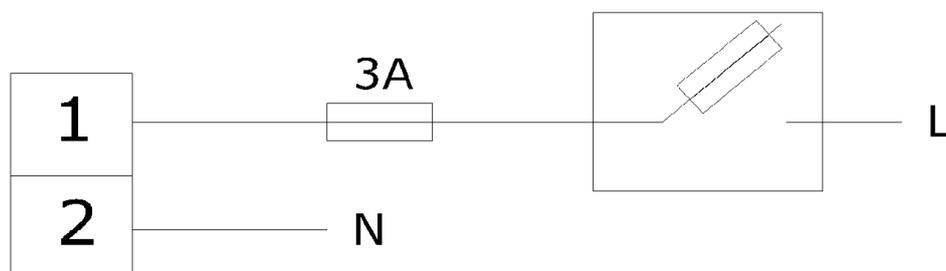
For wiring of probe 4x1 mm<sup>2</sup> screened (shielded) cable, for other wirings 1 mm<sup>2</sup> normal cable can be used.



**Figure 4:** Low Level Alarm Probe (SMLD1000) Wiring



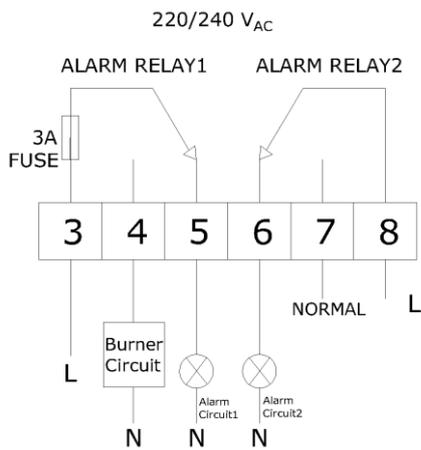
**Figure 5:** High Level Alarm Probe (SMHD1000) Wiring



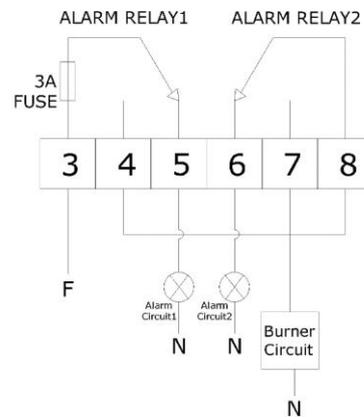
**Figure 6:** Mains wiring

#### 4.2.2 Output Relays Wiring:

SMK1000 has 2 relays as output. These relays can be used independently or can be used together.



**Figure 7: Independently Using**



**Figure 8: Using together**

In independently using example, relay1 and relay2 are used independently of each other. Relay1 is used for burner control and relay2 is used for monitoring / warning. Lamp / bell can be used as alarm circuit.

In using together example, relay1 and relay2 are used together in series. For the burner circuit, number 3 is used as input and number 7 as output. Number 4 is connected to number 8. Outputs 5 and 6 are also used as 2 separate alarm circuits.



#### **Warning!**

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

Probe cable screen (shield) must be connected to GROUND terminal only. (Figure 4) Controller side of the screen must be left unconnected.

Isolate the mains supply before touching any of the wiring terminals as these may be wired to hazardous voltages.

Avoid connecting any other earth to 5th terminal input and must not connected with the other earth on the clipboard.

**Note:** For wiring of SMHD 1000 Level Probe, please refer to “**SMHD 1000 Level Probe Installation and Operating Instructions**”.

**Note:** For wiring of SMLD 1000 Level Probe, please refer to “**SMLD 1000 Level Probe Installation and Operating Instructions**”.

## 5. COMMISSIONING

If all connections are correct and the boiler water level is normal, green led will light up, yellow and red led will be off.

Most faults that occur on commissioning are due to incorrect wiring or setting up. In the case of problems, the following led indicator table may be helpful.

### LED INDICATORS TABLE

GREEN	YELLOW	RED	SITUATION
OFF	OFF	OFF	MAINS SUPPLY Problem
ON	OFF	OFF	NORMAL
OFF	OFF	ON	LOW LEVEL ALARM
OFF	OFF	BLINK	Low Alarm Probe SHORT CIRCUIT
OFF	ON	OFF	DIRT, LEAKAGE
OFF	BLINK	OFF	High Alarm Probe Cable OPEN CIRCUIT

### Manuel Test Button:

While all operation is normal, if the test button is pressed for 3 seconds, the alarm relays will switch to the alarm position for 5 seconds. ( **If the alarm relays are set to stop boiler system, the system stops**)

### Reset Button:

If an alarm occurs, the controller goes into the alarm state and turns off the system. Even if the alarm condition has passed, the device does not exit the alarm state. The reset button must be pressed for the device to exit the alarm state.

## 6. FAULT FINDING

### No LEDs lit:

- Check mains supply wiring is correct.
- Check the mains supply is within specification.
- Check external fuses are normal.

If the problem is still present return the product to the Vira Isi service department.

### Red LED is “ON”, Green and Yellow LEDs “OFF”

- Water level lower than it should be
- Probe cable to Low Alarm Tip (1) is open circuit
- Earth open circuit

### Red LED is “BLINK”, Green and Yellow LEDs are “OFF”

- Probe cable (1) to Low Alarm Tip is short circuit to Earth.
- Low Alarm Tip touches the boiler body

### Yellow LED is “ON”, Green and Red LEDs are “OFF”

- High Alarm Tip is dirty. Electrical leakage to earth.
- Between Low Alarm Tip and High Alarm Tip electrical leakage.

### Yellow LED is “BLINK”, Green and Red LEDs are “OFF”

- Probe cable (2 or 3) to High Alarm Tip is open circuit
- Between Low Alarm Tip and High Alarm Tip electrical leakage.

## 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)