



# Operating & Safety Manual

Sentinel Guard



## **WARNING**

*These instructions are for your personal safety. Always ensure that you have read and understood these instructions before using the machinery. SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE.*



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To watch practical demonstration videos, or to download an electronic copy of these Instructions, please visit [www.picotesolutions.com](http://www.picotesolutions.com). Please note that videos are not intended as a replacement or alternative to this operating and safety manual, but only as an additional learning tool.

## SAFETY INFORMATION



*This section contains important safety information. Failure to comply could result in serious injury or death.*

### Safety Symbols

Safety symbols are used throughout this manual to draw attention to potential hazards.



**Danger** risk of serious injury, follow instructions.

### Personal Protective Equipment (PPE)

Always use Personal Protective Equipment which is needed on a working site where the Sentinel Guard 2.0 is being deployed.

## SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE

### GENERAL MACHINE SAFETY WARNING

**! WARNING** *This section contains important safety information. Failure to comply could result in serious injury or death.*

**Always read all safety warnings and instructions.** Failure to follow warnings and instructions may result in electric shock, fire and/or serious injury.

### SAFETY REQUIREMENTS

**! WARNING** *This section contains important safety information. Failure to comply could result in serious injury or death.*

1. Always follow the instructions in the Picote Solutions manual.
2. **Before each use** inspect the Sentinel Guard carefully for any potential break or damage. **Change damaged sensors immediately.**
3. When in use, it is very important that the Sentinel Guard is stable and on an even surface at all times.
4. **Do not leave the lid open where the Sentinel Guard is being used in wet conditions.**
5. If the working environment is extremely hot and humid, or badly polluted by conductive dust, use a GFCI-enabled power outlet to ensure the safety of the operator.
6. Only use the Sentinel Guard with the accessories and spare parts offered by Picote Solutions. Accessories and spare parts should only be used in the manner intended and as described by Picote Solutions.

### ENVIRONMENTAL

<b>Operational Ambient Temperature Range:</b>	-10...50 °C (14...122 °F) frost and condensation free
<b>Storage Ambient Temperature Range:</b>	-20...60 °C (-4...140 °F) frost and condensation free
<b>Maximum Humidity:</b>	95% non-condensing

### TRANSPORT

Sentinel Guard 2.0 should be transported in car or other vehicle secured so that any sudden movements caused by hard braking or accident are prevented. Always transport Sentinel inside the vehicle.

### STORAGE

Sentinel Guard 2.0 should be stored under cover in condensation frost free environment. It is recommended that Sentinel units are stored indoors protected from rain and sunlight and in a constant ambient temperature.

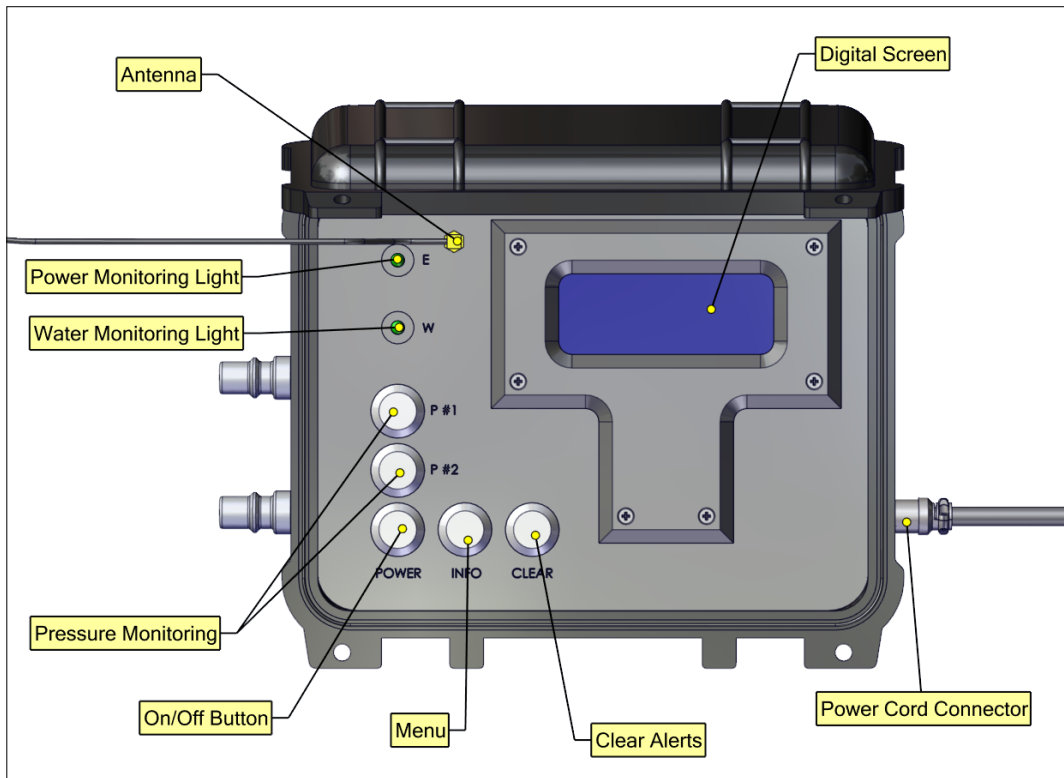
If Sentinel will be stored in a colder environment than +10 °C (50 °F), the machine should be stored at room temperature for 24 hours before use.

### DISPOSAL

Sentinel Guard 2.0 can be disposed in Europe at Waste Electrical and Electronic Equipment (WEEE) collection points. Always follow the local waste handling rules and regulation.

# Sentinel Guard—Overview

## GENERAL INFORMATION



## TECHNICAL DATA

Size (mm/inches)	Pressure connectors	Power Supply Monitoring	Weight (kg/lbs)	IP Rating
287x205x180 11"x8"x7"	2	110-230V / 50-60Hz 400V / 50-60Hz	5.8 / 12.8	67 sealed closed 64 opened

## INTENDED USE

This machine is intended for the following uses;

1. Monitoring pressure of the linings.
2. Monitoring power supply.
3. Monitoring water level in pumping stations.

Sentinel has a built in remote alarm feature. This allows it to send an alert message to a mobile phone in cases of power outage, fluctuation of the pressure outside the limits or water level in a pumping station rise too high. The alert messages are sent via the GSM network.

## INDICATORS & SWITCHES

Indicator/Switch	Function
E	When lit, power supply monitoring is enabled
W	When lit, water sensor monitoring is enabled
P # 1	Pressure monitoring sensor 1 ON/OFF
P # 2	Pressure monitoring sensor 2 ON/OFF
POWER	Power ON/OFF
INFO	Toggle screen menu
CLEAR	Stop ongoing SMS alerts

# Sentinel Guard—Overview

## VOLTAGE & POWER SUPPLY

**Ensure that the supply voltage is correct.** The voltage of the power source must match the value given on the nameplate of the machine within the tolerances of  $\pm 10\%$ . Machines with a 230V plate can be used in 220V mains and 110V machines in the 120V grid.

The machine has been double sealed according to European standards. The power source has to be grounded.

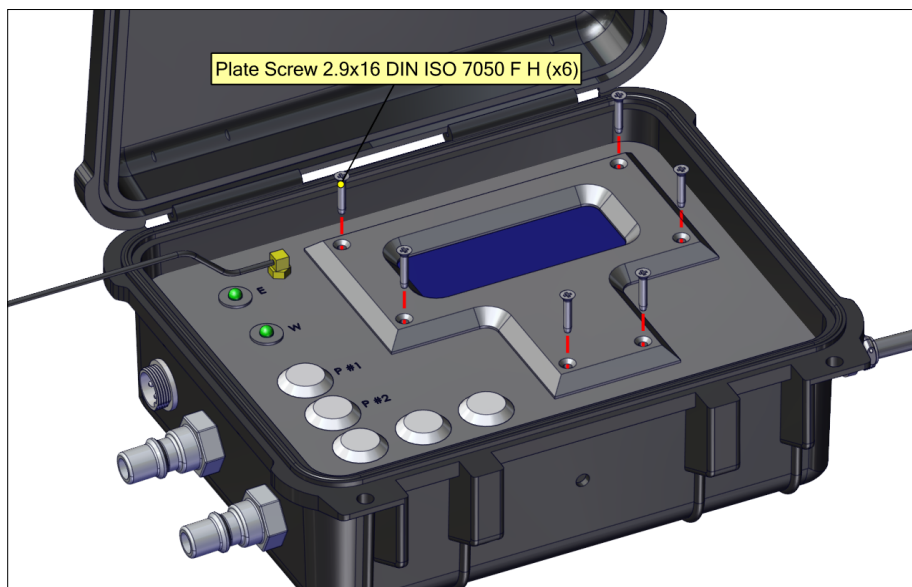
To begin using the Sentinel device, connect it to a mains power socket using the provided cable.

Always connect the power supply provided to the Sentinel unit. The unit has a back-up battery as well, but it is only intended as a back-up for pressure measurement and to send alarm messages in the event of power failure, and is NOT a substitute for the mains power supply.

## SIM CARD

Sentinel Guard uses a Mini sized SIM card. The SIM card slot is found next to the LCD screen, under the T shaped cover. To access the slot, unscrew the six screws holding the cover (see picture from below). The SIM card slot opens by sliding it to the left and lifting it up. **Before inserting the SIM card into the Sentinel Guard, the PIN code lock must be turned off.** This can be done by inserting the SIM card into a mobile phone and turning the PIN code lock off. After inserting the SIM card into the Sentinel, put the T shaped cover back on top, and gently fasten the screws.

It is recommended to use subscription based SIM cards and not prepaid SIM cards. Prepaid SIM cards might run out of credit or be closed down inconspicuously.



## START UP

To begin using the Sentinel Guard device, connect it to a mains power socket using the provided cable. Start the device by pressing the POWER switch. The startup process will take a few seconds, and after that the device is ready to use.

Always connect the power supply provided to the Sentinel Guard unit. The unit has a back-up battery as well, but it is only intended as a back-up for pressure measurement and to send alarm messages in the event of power failure, and is NOT a substitute for the mains power supply.

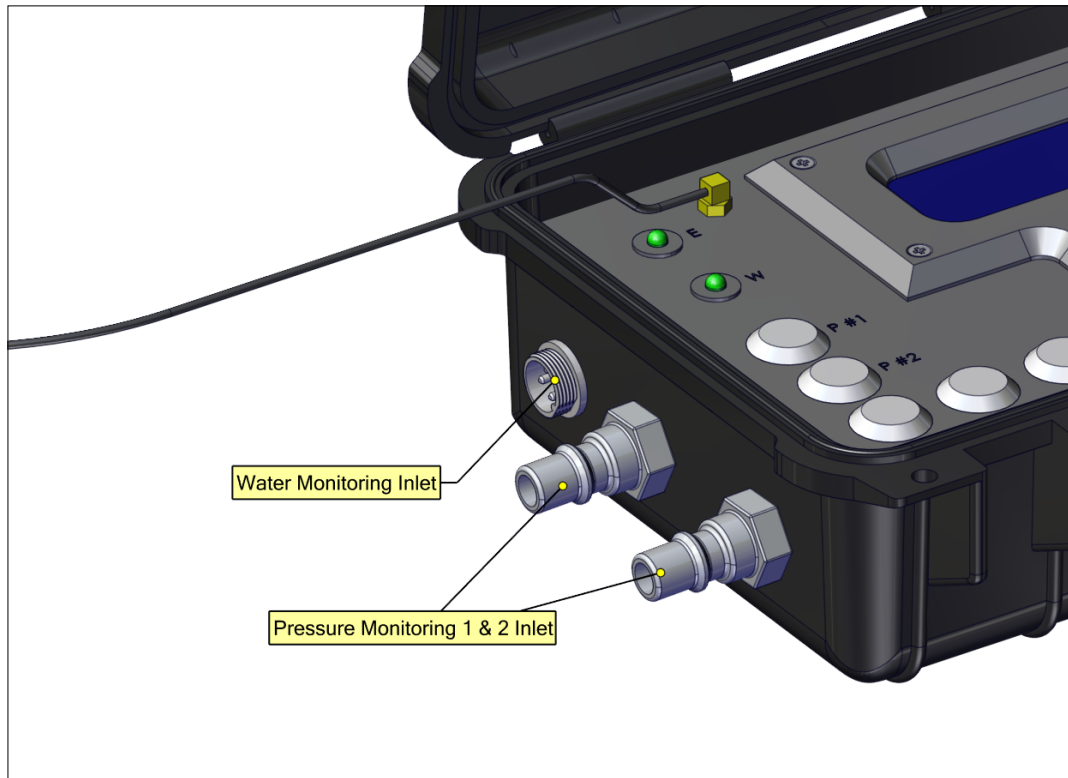
# Sentinel Guard—Features

## CONNECTORS

There are three different types of connectors in the Sentinel device: pressure, water, and power. The pressure connectors and water sensor connector are located on the left side of Sentinel. The power supply connector is located on the right side of Sentinel.

When connecting the power supply connector or the water sensor connector, push the connector to the socket, and screw the threaded nut all the way in. The power and water sensor connectors have a groove and cannot be connected if misaligned. The power and water sensor connectors have protective covers that are meant to be used when the connector is not in use.

# Sentinel Guard—Features



## LCD SCREEN—DEFAULT SETUP

Screen has five different pages which can be changed by pressing the INFO switch.

## PRESSURE & POWER ALERT

The first page of the LCD screen shows the pressure from both sensors. This makes it possible to monitor the liner pressure at the same time as adjusting it. The pressure is shown in kilopascals (kPa). Along with showing the pressures, the first page also shows if the power alarm is disabled or enabled.

10 kPa = 0.1 Bar, 100 kPa = 1.0 Bar, 10 kPa = 1.45 psi

Line	Function
Pressure#1: 0kPa	Pressure data from sensor 1
Pressure#2: 0kPa	Pressure data from sensor 2
Power alarm enabled/disabled	Status of the power alarm

## PRESSURE ALARM LIMITS

The second page of the LCD screen shows the low and high limits of the pressure alarms. The limits can be chosen individually for both sensors. The limits work intuitively: if the pressure drops below the low limit, or raises above the high limit, alert messages will be sent.

**The default limits are 35 kPa (5.07 psi) for low limit and 85 kPa (12.3 psi) for high limit.**

Pressure alarm limits can be changed at any time. Look at the section: **Changing Parameters.**

Line	Explanation
L1:	Pressure low limit from sensor 1
L2:	Pressure low limit from sensor 2
Line	Explanation
H1:	Pressure high limit from sensor 1
H2:	Pressure high limit from sensor 2

# Sentinel Guard—Features

## UPTIME

The third page of the LCD screen shows the uptimes. The uptimes can be used to monitor the amount of time the liner has been curing. The uptime begins to run when the respective P# switch is pressed. The uptime resets to zero if the respective P# switch is pressed again or if the Sentinel device is rebooted.

## DETAILS

The fourth page of the LCD screen shows some useful pieces of information, such as the GSM network signal, the serial number of the device, and the GSM number of the SIM card. Some network operators do not save the GSM number to the SIM card. In this case, the GSM number will be shown as unknown. **You may write the number of the SIM card to the quick help sticker located in the Sentinel case instead.**

Line	Explanation
Signal: 0-10	GSM signal strength
Serial:	Serial number
GSM#:	SIM card number

## GSM NUMBERS

The final page of the LCD screen shows all the numbers in the SIM card memory. The numbers are shown as a list, and if more than 4 numbers have been added, the page will scroll down for a new set of numbers.

# Sentinel Guard—Functions & Usage

## ALARM

The Sentinel Guard device has two stages should an alarm occur. First, **the device will alert with sound and light signals for two minutes.** Second, if the cause of the alarm has not been fixed within the two minutes, **the device will start sending alert messages.** The alert messages are sent via the GSM network. The alert messages will include the cause of the alarm. **Along with sending alert messages, the device will call the number for a short amount of time.** If the cause of the alarm is fixed after the messages have been sent, **the Sentinel device will send messages notifying that the alarm condition has been fixed.**

## GSM NETWORK SIGNAL & ANTENNA

The Sentinel Guard device works in the GSM network. **Therefore, it is imperative to have a GSM network signal.** The signal level can be seen in the details page of the LCD screen by pressing the INFO button. Should the signal drop below 2, the LCD screen will turn red and the signal level is being flashed in the details page of the LCD screen.

The antenna is located on the inner lid of the Sentinel device, to which it is attached with a black velcro tape. **If the signal is too weak, you can try to either reposition the Sentinel device, or take out the antenna and move it around to find a high signal spot.**

## PRESSURE MONITORING

**The Sentinel Guard device can monitor either the pressure of a liner or a compressor.** To connect the pressure to the Sentinel Guard, use a T–adapter.

Both measuring and monitoring the pressure is possible with the Sentinel Guard device. To measure the pressure, simply connect a pressure connector to one of the pressure ports of the Sentinel Guard device. To monitor the pressure, simply connect a pressure connector to one of the pressure ports and push down the respective P# switch. **Should the pressure drop below the low limit, or rise above the high limit, the device will begin the alarm procedure.**

The pressures can also be checked remotely by sending an SMS command “Pressure” to the device. The device will then respond with a message “Pressure (kPa): #1 xx, #2 yy” where xx and yy are the pressures of the sensors #1 and #2.



# Sentinel Guard—Functions & Usage

## POWER FAILURE ALARM

The Sentinel Guard device can also be used to monitor the mains power supply. The device can be connected to the same mains socket as the compressor or pumping station. **Should there be a power outage, the device will begin the alarm procedure.** The status of the mains power supply monitoring can be seen in the first page of the LCD screen. If the device is started without connecting the power connector, the screen will remain red and the power supply monitoring will be disabled.

## WATER SENSOR

The Sentinel Guard device can also be used to monitor water level. **The device will come with one water sensor included.** The sensor can be connected to the water sensor socket, after which the W# indicator will be lit. If the indicator is not lit even though the sensor is connected, the sensor might not be properly connected; reattach the sensor. The sensor should be installed around 5 to 10 cm above the floating valve of the pump. **The sensor should not be installed directly below the inlet pipe of the pumping station; instead, install is so that it is clear of major splashes. Should the sensor be covered in water, the device will begin the alarm procedure.** The sensor will most likely get dirty during usage, and it can be cleaned by unscrewing the four Phillips screws and rubbing the circuit board found inside with rubbing alcohol.

# Sentinel Guard—Changing Settings & SMS Commands

The Sentinel Guard default settings can be changed when needed by SMS commands. Simply send a command message to the device number to alter any setting needed. Press Info Button to check from the correct page that the setting has been changed as intended.

Function	SMS Command Line
Adding Number	Add 0449587362
Deleting Number	Del 0449587362 or Del 2*
Changing the pressure limit	L1 45—sets the low limit of sensor 1 to 45 kPa (0.45 bar)
	H2 65—sets the high limit of sensor 2 to 65 kPa (0.65 bar)
Changing the alarm delay	Alarm 30—sets the delay to 30 seconds
Changing the units	Units psi—changes the units to psi
	Units kpa—changes the units to kPa
Pressure request	Pressure

\* 2 is the index number you want to delete. The index number can be seen in the phone number page of the LCD screen.

## CHANGING THE ALARM DELAY

**By default, the Sentinel Guard is set to wait 2 minutes from the triggering of an alarm before sending alarm messages.** The delay can be changed with the command “Alarm xx” where xx is the alarm delay in seconds. For example, the command “Alarm 30” would change the alarm delay to 30 seconds.

## CHANGING THE UNITS

The units of the pressure shown by the Sentinel Guard can be changed with a command. Changing the units to kPa can be done with the command “Units kpa”, and changing the units to PSI can be done with the command “Units psi”.

# Sentinel Guard—Changing Settings & SMS Commands

## CHANGING THE PRESSURE LIMITS

The limits for the pressure alarm can be changed individually for both sensors by SMS commands. The low limit for sensor 1 can be changed with the command “L1 xx” where xx is the new limit in kPa. The low limit for the sensor 2 can be changed similarly with the command “L2 xx”. The high limit for sensor 1 can be changed with the command “H1 xx” where xx is the new limit in kPa. The high limit for sensor 2 can be changed similarly with the command “H2 xx”.

As an example, sending the command “L1 25” will change the low limit of sensor 1 to 25 kPa, and sending the command “H2 60” will change the high limit of sensor 2 to 60 kPa.

SMS Command Line	Function
L1 xx	Change the pressure sensor 1 low limit
L2 xx	Change the pressure sensor 2 low limit
H1 xx	Change the pressure sensor 1 high limit
H2 xx	Change the pressure sensor 2 high limit

## MANAGING PHONE NUMBERS

The phone numbers saved in the SIM card memory are shown in the phone number page of the LCD screen. **The alarms will be sent to each of these numbers. The maximum amount of numbers stored in the SIM card memory is 20.** The numbers are listed as shown below:

#1 0501111111
#2 0502222222
#3 0503333333
#4 0504444444

The numbers can be added and deleted with two ways: via SMS commands or by inserting the SIM card into a phone.

As an example, the command “Add 0503334567” would add the number to the SIM card memory. The command “Del 0503334567” would delete the number from the SIM card memory. The command “Del 3” would delete the phone number with the index number 3 from the memory (from the above list the command would delete the number 0503333333).

## REQUESTING PRESSURE INFORMATION

The pressures can also be checked remotely by sending an SMS command “Pressure” to the device. The device will then respond with a message “Pressure (kPa): #1 xx, #2 yy” where xx and yy are the pressures of the sensors #1 and #2.

## MAINTENANCE

- ⚠ WARNING** 1. Before performing any maintenance always check that the machine is fully turned off and unplugged.
2. Carefully inspect the hoses and cables to ensure that there are no signs of wear and tear. Replace when required.
3. For safety and efficiency, always keep the machine clean.

In case there is problem that you cannot solve using this manual, please consult your reseller or Picote Solutions.

## ACCESSORIES & SPARE PARTS

**⚠ WARNING** You must use only the Picote Solutions accessories and attachments with the machine described in this operations manual. The use of other accessories or attachments could present a risk of injury or death. The accessories or attachments should only be used in the proper and intended manner, and always follow Picote Solutions instructions.

6100000020	Sentinel Liner Guard Type 1 EU
6100000021	Sentinel Liner Guard Type 1 USA
6100000022	Sentinel Liner Guard Type 1 UK
6100000023	Sentinel Liner Guard Type 1 Australia
6100000102	Sentinel Water Level Sensor
6100000101	Sentinel Water Level Connector Block

## WARRANTY POLICY AND PROCEDURE

### Limited Warranty:

Picote warrants to the original End User that the Product purchased by such End User will operate in accordance with and substantially conform to their published specifications when shipped or otherwise delivered to the End User and for a period of one (1) year, except electric motors for which the warranty period shall be six (6) months, provided, however, that Picote does not warrant any claim or damage under this Warranty if such claim or damage results from:

1. Consumable parts included the Products (such as brushes) or normal wear and tear resulting from use of the Products,
2. Product overload or overheated motor,
3. Regular periodic maintenance of Products,
4. Misuse, neglect, or improper installation or maintenance of the Products, or use of Products not for their intended purpose,
5. Products that have been altered, modified, repaired, opened or tampered with by anyone other than Picote or an authorized Picote Service Centre, or unsuitable or unauthorized spare parts, accessories or third party products when using the Products or;
6. the use of the Products not in compliance with their respective Documentation, user manuals, safety and maintenance instructions, and any usage restrictions contained therein, or
7. accident, fire, power failure, power surge, or other hazard.

Otherwise, the Products are sold AS IS. End User is responsible for using the Products within their specifications and instructions as contained in the Documentation.

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