VLTS / VLTSC

Temperature and Humidity Recorder – Stores, Prints and Alerts

OPERATING MANUAL

Please note: This device contains data by regional default or as you requested. Before turning on the device, you must print a "Settings" report and verify that the data on the device meet your requirements. Supco is not and will not be liable for entering the data**.**

Supco International Ltd.
3 HaOmanut St., PO Box 8047, Sapir Industrial Zone, Netanya 4250437 Israel
Telephone: +972-9-8654101; fax: +972-9-8659111
www.supco.co.il info@supco.co.il

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Supco International Ltd., 3 HaOmanot St., PO Box 8047, Sapir (Poleg), Netanya 4250437 Israel.
Telephone: +972-9-8654101; fax: +972-9-8659111. www.supco.co.il info@supco.co.il

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Installation

1. The devices in the package are designed for hanging on a wall or placing on a table.
2. To hang the product on the wall, make sure that you use the appropriate screws. Tighten all the screws to secure its position and prevent the product from falling.
3. First make all the connections to the device, and only then connect the power supply.

Precautions

1. Install the product in a dry environment. Prevent moisture conditions and water leaks.
2. Protect the device and the power supply from extreme temperatures. Do not install the product near a radiator where it is exposed to direct sunlight.
3. Prevent falls of objects on the product. Prevent spillage of any liquids, such as strong acid.
4. Connect the power supply/unit to the voltage indicated on the unit.
5. To prevent damage to cables and connectors, do not disconnect cables by pulling them.
6. Run the cables so that they do not pose a hazard. Make sure the cables are not damaged.

Warnings

1. Do not replace cables or connectors with non-genuine parts.
2. Improper connections can cause fire and electric shock.
3. The power supply is for internal use only.

TABLE OF CONTENTS

CHAPTER 1 OVERVIEW

- **VLTS** – stores data, prints and alerts up to 4 channels. Temperature/ humidity/ 4-20 and contact switching.
- **VLTSC** – stores, prints and alerts with a SIM slot and a GSM cellular modem for viewing and backing up data, remote settings, GPS geolocation, SMS and email alerts.
- **Temperature sensor** – temperature sensor only (electronic)
- **Humid/Temp** – temperature and humidity sensor (in one body)
- **Humidity sensor** – configuring the temperature and humidity sensor to measure humidity only.
- **Contact switch sensor** – on/off sensor between wires 1-6, blue and white.
- **4-20/0-20mA/0-5V/0-10V sensor** – Analog transducer sensor corresponding to representative figure.
- **USB** – standard for connecting computer peripherals for data transfer or storage.
- **Micro-SD** – A miniature memory card for transferring or storing data.

In addition, in the **VLTSC** model only:

- **Micro-SIM** – card for communication in a cellular network.
- **GPS** – geolocation system on a map.
- **GSM** - standard for cellular communication networks.
- **SMS** – messaging service (text) on GSM networks to a mobile phone.

The VLTS devices record, store and print up to 35,040 readings at predefined time intervals for 4 data sources or 4 cooling systems simultaneously. The VLTS device triggers an alarm when the temperature/reading value rises or falls below the set range. The alarm can operate immediately when the reading is off the set range, or after the reading stays out of the set range for a set time (delay). The VLTS device enables various printing modes, including the ability to store data in internal memory and also on a memory card or disk-on-key, and it sends an alarm to an external device through a connection to the alarm contacts on the device.

In a VLTSC device, after connecting the GSM/GPS antenna and installing a compatible micro-SIM (not included), the data can be sent by cellular communication for backup and viewing through a compatible web portal, adjust settings remotely, view the unit's location on a map and automatically alert by SMS up to 5 recipients and similarly, through the email portal, alert up to 5 recipients through the e-mail portal.

The sensors' reading range

Temperature range – with temperature sensor: - 40ºC to +130ºC at ±0.5ºC accuracy.
Temperature range – with temperature and humidity sensor: -40ºC to +130ºC at ±0.5ºC accuracy.
Relative humidity range – with temperature and humidity sensor: 0% to 100%, 10%-90% RH at ±2% accuracy.
at the rest of the range: 90.1%-100% / 0-9.9% RH at ±4% accuracy.
Contact sensor – indicates on/off switch status.
Voltage sensor – analog Transducer 0~10, 5~10 Vdc and correspondence to representative value, ± 0.5 F.S.
Current Sensor – analog Transducer 0~10, 4~20 Adc and correspondence to representative value, ± 0.5 F.S.
Response time – sensor: voltage and current: 1 second; for contact sensor: detects change of state up to 10 seconds.

FEATURES

Table 1: Temperature Recorder and Printer – Features describes the VLTS features with reference to the section and page in this manual that describes how to use the feature or set it.

Table 1: Temperature Recorder and Printer – Features

Feature	Chapter, for more information	Page
Various sensor types can be connected	"Setting Sensor Types"	18
Alarm and delay range settings for each sensor	"Setting Alarm Limits to Sensor"	21
Change sample rate, from 30 seconds to 120 min.	"Changing the Sampling Rate"	26
Display of measured values, daily min/max values	"Displaying Measurement Values"	10
Auto print daily min/max value report	"Setting Printing Time and Daily Min/Max Reset"	24
Setting daily print and reset to min/max Values	"Setting Printing Time and Daily Min/Max Reset"	24
Activate/deactivate automatic continuous printing	"Automatic Continuous Real-Time Printing"	11
Select a printing style from 4 options: graphic, small text, large text or table	"Style of Automatic Continuous Real-Time Printing"	12
Turn on/off internal buzzer in alarm events	"Setting up Additional Alarm Events"	22
Print reports and print device settings.	"Printing"	11
External Alarm Contact Port 1A.	"Alarm Settings" "Other Connection Options"	20 8
Alerts for low battery and printer out of paper	"Setting up Additional Alarm Events"	22
Assign name for each sensor/channel.	"Renaming Channels for Sensor Identification"	20
Assign name for each unit, vehicle/place number and company name.	"Renaming the Device for Identification"	25
Copy data to SD-card/ USB memory stick	"Copying data to external memory"	14
Change temperature units to Celsius or Fahrenheit; Change date format to European or U.S.	"Setting Temperature Scale and Date Format"	24
10-30V operating voltage, 9V backup battery	"Power Sources"	9
Up to 48-hour backup battery for reading & storage	"Installing and Replacing the Batteries"	9

DESCRIPTION

Image 1 displays the connections at the front of the VLTS/VLTSC device.

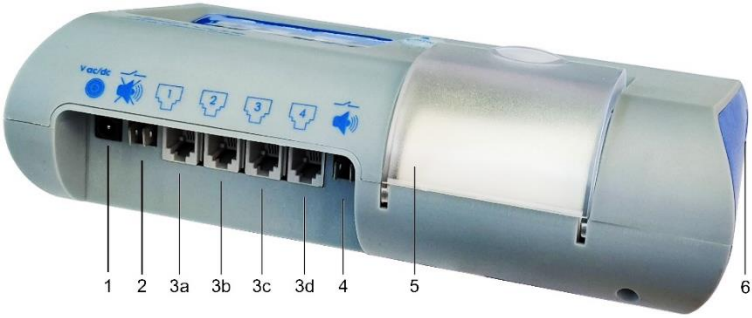


Image 1: Temperature Recorder and Printer – Front View – Connections

1. Power input socket: 12-24V ac/dc
2. Short contacts for muting internal alarm
3. Sensor input ports 3b, 3c, 3d 3a,
4. Dry contact for external alarm
5. Paper cover
6. 9V Backup battery cover

Image 2 displays the connections at the rear of the VLTS/VLTSC device.

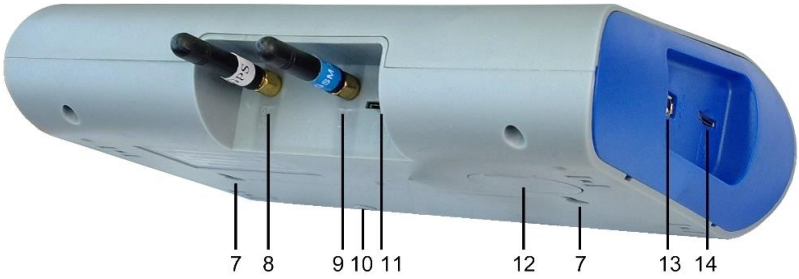


Image 2: Temperature Recorder and Printer – Rear View

7. Holes for installing on wall
8. *GPS antenna port, SMA port
9. *GSM antenna port, SMA port
10. Hole to secure hanging on wall
11. Micro-SIM cellular card slot
12. CR2032 clock battery housing
13. USB disk-on-key connection
14. Micro-SD connection

* Items 8, 9, 11 are available only in model VLTSC.

Image 3 displays the buttons and display of the VLTS/VLTSC device.

Daily min/max menu, settings, and data copying

OK	**EXIT**	**PRINT**	**FEED**
Turn on/off with long press, Confirm	Mute buzzer, Stop report, Exit	Print and reports menu	Paper advance, Delete character <Backspace

Image 3: Temperature Recorder and Printer – Buttons and Display Panel

Image 4 displays the display panel of the VLTS/VLTSC device.

Image 4: Temperature Recorder and Printer –Display Panel

Indicator lights:

On / flashing upon Backup power

Low Backup battery / flashing at low clock battery

No paper

Alarm

Channel 1

Channel 2

Channel 3

Channel 4

In VLTSC only: GPS reception signal, cellular signal

CHAPTER 2 INSTALLATION

This chapter explains how to install the VLTS device, including:

- **Package content** – the list of contents in the VLTS package
- **Installation options** – options of installation, connection and hanging the device on the wall
- **Connections** – description of the required connections and additional connection options, including basic operating instructions for the VLTS device
- **Power** – the electrical power requirements, the Backup battery operating capacity and how to install or replace batteries.

PACKAGE CONTENT

The VLTS package includes the following accessories:

Table 2: Package Content

Part Number	Quantity	Description
VLTS VLTSC (with internal cellular modem)	1	VLTS unit with up to 4 measurement channels
VLS CABLE (143168) VLT PROBE VLTSHPROBE	- 1 -	Event sensor, 10 meters (ON/OFF) Temperature sensor, 10 m. Temperature and humidity sensor, 10 m. meters
VLPAPER	2 (1 installed)	57 mm wide thermal paper roll, 40 meters long for 17,400 lines of text
VL220 (Europe plug)	1	Transformer adapter from 230V to 12V 2A
143175	1	12-30V DC plug wire for connection in vehicle
VLBAT	1 (installed)	3V lithium battery (CR2032)
VLTSMANUALH (143387)	1	User guide in English
VLANT	-/1	GSM/GPS integrated antenna for VLTSC
VLGSM	-/1	GSM "finger" antenna for VLTSC
VLGPS	-/1	GPS "finger" antenna for VLTSC

WALL INSTALLATION

VLTS may be used as a mobile unit or it may be installed on a wall.

- **Wall installation** – Hang the VLTS directly on the wall, on 2 horizontal screws 145 mm apart and secure with a third screw to the wall under the paper rolls (3 screws and dowels are provided in the bag).

CONNECTIONS

This part describes the cables that must be connected to enable use of the VLTS and other accessories that may be connected for other, additional applications.

Mandatory connections and activation

To connect and operate the VLTS:

1. Connect the transformer to the power supply and the plug in the wire to the 12V socket (item 1 in Image 5).

2. Connect the temperature, temperature/humidity sensors, circuit closing and other sensors to the sockets (items 3a, 3b, 3c, 3d in Image 5) from left to right.
3. To turn on, press the OK key for 2 seconds (item OK item in Image 3), the green POWER light and the display will turn on. After a few seconds, the measured values will appear on the display.

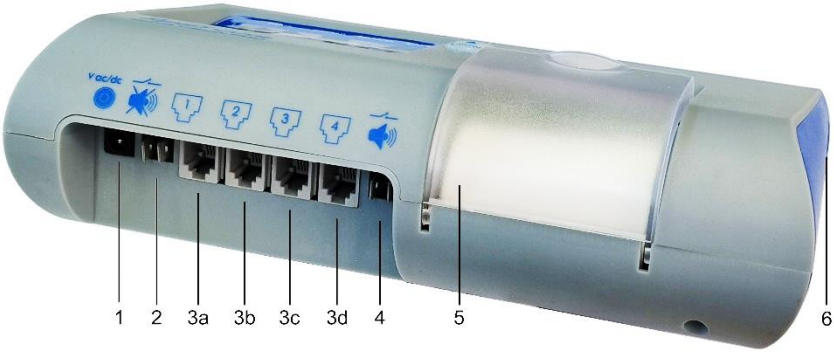


Image 5: Connections

Other Connection Options

Other accessories (not included in all models) may be connected, as follows:

- **External alarm contact** – pair of ¼ terminals of an internal alarm relay, N.O. 1Amp 12V (item 4 in Image 5). The contact closes in alarm events.
- **Micro SD card** – (not included) for saving a backup file to the measurement data in addition to the internal memory and saving device settings for copying to another device (Item 14 in Image 2). Recommended memory: 4GB to 16GB, Class 4 at least. In installation, the contact surfaces are up. Press in to release the lock.
- **USB disk-on-key** – (not included) for saving a backup file of the measurement data in addition to the internal memory and saving the device settings (for copying to another device). (Item 2 Image 2). It is recommended to install a USB 2.0 disk-on-key up to 16GB.
- **Remote alarm buzzer muter** – (not included) by connecting 2 wires from the pair of the buzzer muting contacts (item 2 in Image 5) to the momentary spring button. In an alarm, a momentary short circuit between these contacts will silence the buzzer for this event (only the buzzer!).

In the **VLTSC** model (GSM/GPS cellular model), the following can be installed also when the device is turned off:

- **GPS antenna** to the GPS port (item 8 in Image 2) to display the location of the VLTS unit on the map in the portal.
- **GSM antenna** to the GSM port (item 9 in Image 2).
- **Micro-SIM Card** (not included). Insert into the SIM slot (item 11 in Image 2), with the contacts facing downward / toward the wall. For SMS notifications through an internal cellular modem, data export to cloud and remote settings through the portal.

Power Supply

The VLTS device is powered from 10-30V ac/dc 2Amp power source, 9V backup battery in case of main voltage drop and a CR2032 clock battery for the clock and settings. All batteries are replaceable.

Power Sources

The VLTS is powered at the main power input from a 10-30V ac/dc 2Amp power source. When the VLTS uses the main power source, the POWER green LED is turned on.

At an external voltage below 10V, or at ambient temperatures above 65ºC, the VLTS will switch to backup mode on a 9V battery (if installed), 9V lithium 1200mA is recommended.

In backup mode, the VLTS displays and stores readings in the memory and does not print. The POWER indicator LED will flash slowly. The display lighting and buttons will turn off. The buzzer cannot be turned off in an alarm event.

When voltage return above 10V and the ambient temperature is below 65ºC, the POWER light will remain lit. If the printer was previously active, it will automatically complete the report of the readings that were stored in the memory and were not printed when the VLTS switched to backup mode.

Installing and Replacing the Batteries

The VLTS uses two batteries, as follows:

- **CR CR2032 lithium battery** – for saving the settings and the clock. It is located at the back of the device. When the LOW BATT light flashes, replace it to a new one, and check and update the settings.
- **9V backup battery** – 1200mAh. It is recommended to replace it after every power outage (battery not included). Used for backup for about 48 hours during a power outage. When the LOW BATT light is on continuously, replace it with a new 9V battery.

To install or replace the batteries:

1. Press the battery cover and pull out, as shown in Image 6.
2. Install the batteries as indicated, paying attention to the polarity marks (-/+) and place the cover.

Image 6: Installing or replacing batteries

CHAPTER 3 OPERATION

This chapter explains how to operate the VLTS, and includes the following topics:

- **Displaying reading values**
- **Printing**
- **Deleting all readings from the internal memory**
- **Copying data to external memory**
- **Alarm indication**

DISPLAYING MEASUREMENT VALUES

To turn on the VLTS, press the OK key for 2 seconds. The system version will be displayed for 5 seconds and then the 4-channel screen and the POWER light will be on. If a channel deviates from its settings, the channel value will flash, the ALARM light will come on and other alerts, if set, such as alarm contact, buzzer (to mute, press the EXIT key), and in the VLTSC cellular model, also SMS messages, will be activated. For "*Setting Sensor Types*", see page 18. For *Alarm Settings*, see page 20. The channel name in the display consists of a letter representing the sensor and the number of the channel. The memory contains up to 35,040 recent readings per channel. The data range in the memory depends on the sampling. For example: in 15-minute sampling, the memory will contain data from 4 channels, one year back.

Viewing the current reading, daily minimum and maximum

- **Displaying current value** – after switching on, 4 channels will appear on the display simultaneously. In the VLTSC cellular model, a graduated sign indicating cellular reception strength will also show, and in the center of the lower row, also an indication for GPS reception.
- **Displaying the daily minimum/maximum value (min/max)** – Press ▼, and **sensor value, Daily min and max** will be displayed. Press OK to confirm. The minimum and maximum values for channel 1 will be displayed.
  To display minimum and maximum values for another channel (1-4), scroll with ▲/▼.
- **To exit and view the 4-channel screen** – double-press EXIT. If for 30 seconds nothing is pressed, the current value of the 4 channels will be displayed.

Minimum and maximum data are automatically reset every day. They can be printed automatically every day before they are reset. The default reset time is 8:00 AM. To change the time and set **printing daily min/max data and reset**, see "*Setting Printing Time and Daily Min/Max Reset*" on page 24.

Notes: The minimum and maximum data in memory are the extreme values from continuous measurement and therefore there may be more extreme values than the sampling data in memory.
The dry circuit/contact channel will show which of the ON/OFF events took place.

Display Format of values and alerts

The display shows 4 channels simultaneously. Each channel has a name that includes the channel letter and number, the measured value and the units of measurement. The channel letter represents the type of sensor: H - humidity; T - temperature; V - voltage; I - current; S -

contact; P - power supply voltage to the device; X - unmeasured channel. The channel number is the physical entrance that the sensor is connected to, from left to right (for an integrated temperature and humidity sensor, both will have the same number). The temperature units are displayed according to the scale selected (Celsius or Fahrenheit), or other markings for "special" sensors for low voltage or current. When a channel exceeds the alarm threshold settings and delay time, the measured value will flash and a red ALARM LED will lit over the display. If a sensor is flawed, not connected, or does not match the channel settings, the value ERROR will be displayed. Examples:

- Temperature: **T1: 130.0C T2: -39.9C** (the degrees in Celsius/ Fahrenheit)
- Relative humidity: **H1: 0.1% H2: 99.9%** (marked with the letter H and the units in %)
- Channel set to be (electric) contact in an open/closed position: **S4: ON/OFF**
- Channel set to be without a sensor will show: **X4: NoSens**
- Faulty/not connected/not set up correctly: **X4: ERROR** flashing

PRINTING

For the print menu, press PRINT or by scrolling ▼/▲, Find **Print submenu** and press OK to confirm. Select one of the 5 printing options below by pressing ▼/▲ and press OK to Print the chosen report.

- **Print, Real-time printing** – continuous real-time printing.
- **Print, Delivery ticket** – printing a 4-channel report of current reading.
- **Print, 4ch 300 records** – printing a 4-channel report of 300 readings.
- **Print, Spec & programming** – printing a report of all the settings in the device.
- **Print, Daily min & max** – printing a min/max report (since the last reset).

Note: accessing the print menu does not require a password.

Automatic Continuous Real-Time Printing

Print, Real-time printing – automatic, continuous printing in real time of each sampling in a line according to the sampling rate. For "Changing the Sampling Rate", see page 26. The automatic printing style can be selected from 4 styles by scrolling with ▼/▲, as follows:

- ▽ **Disable** – without automatic printing (a report may be printing manually)
- ▽ **4 Ch Table** – a continuous report, 4 channels per line, in a table format
- ▽ **1 Ch Table** – a continuous report, 1 channel, date and time on each line.
- ▽ **1 Ch graph** – a continuous report, 1 channel, graphic, and alarm limits
- ▽ **1 Ch large font** – a continuous report, 1 channel, in large print/font.

To confirm, press OK. For a 1-channel report, select from channels 1-4 by scrolling ▼/▲ and press OK for confirmation. The selection will be saved, and the prompt **Please wait. Saving settings** will be displayed, then **Settings saved** will be displayed and printed, followed by the measurement screen.

If **automatic printing** is selected, the report will be printed line by line at the sampling rate.

Notes: The menu options that are not selected are shown with * at the end of the line.

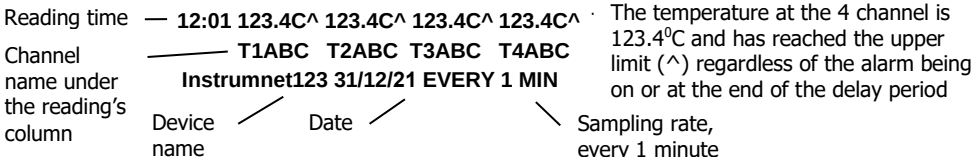
When printing a report, the prompt "Printing" will be displayed. At the end of the printing, the normal display will be returned.

In the print menu, if you do not press any button for 30 seconds, the VLTS will revert automatically to the main measurement display without saving the changes. Even when printing one channel, the VLTS stores all the channels in memory.

The ^ or v mark in the report indicates reaching the reading limit, regardless of whether the alarm is on.

Style of Automatic Continuous Real-Time Printing

▽ **4 Ch Table** printing prints all 4 channels on a line, as follows:



In this printing style, 2 information lines will be shown after every 12 readings lines, stating: channel names, device name, date and sampling rate.

▽ Printing in the **1 Ch Table** style prints in the small font style. Each line of data represents one sample and includes the following details: vehicle/site name, channel symbol, date, time, values and limit mark if reached, as in the following:

```
Office1 T1 31/12/21 12:00 123.4C^
```

In this example, the vehicle/site name is office1 (see: "Renaming for Device Identification" in page 28); the channel symbol is T1; the date is December 31, 2021 (see "Setting Time and Date" in page 27); the time is 12:00 AM; the temperature is 123.4ºC; and the character ^ indicates reaching the upper limit.

▽ **1 Ch graph style** printing style prints one graph channel. The value appears in each line on the right and is printed on a graph as a dot with a line that connects it to a dot in the previous line. The defined maximum and minimum limit range are shown as dashed vertical stripes on either side of the graph. Each 12th line is printed in the small font style. If the measured value has reached the defined upper or lower limit, the character ^ or v will appear on the right side of the relevant line.
1 Ch large font printing style prints one channel in large font. Each sampling in one line includes the following details: channel symbol, day of the month, time, the value measured and alert for reaching the upper or lower limit (v\^). For example: T1 28 23:12 123.4C ^

Printing on-Demand Reports

The VLTS has 4 types of structured reports, ready for printing on demand at any moment. Press PRINT, select the report type by ▼/▲, and press OK for confirmation.
Or scroll through the main menu by ▼/▲, and select the **Print submenu**, then press OK to confirm. Select the repot for printing by ▼/▲, and press OK for confirmation.
To stop printing the on-demand report at any time, press EXIT. The printing will stop with the following text message: THE REPORT STOPPED BY USER.

▲ **Print, Delivery ticket** – printing current reading report from all channels (such report is generally attached to bills of lading). Press PRINT, select that report by ▼/▲, and Press OK for printing, or press EXIT twice to return to the measurements display.

- **Print, 4ch 300 records** – printing a 4-channel report up to 300 entries. In this menu, select by the ▼/▲ one of the time windows (from – to) and press OK for printing it. To stop printing, press EXIT. For exit to the measurements display, press EXIT twice or ▼/▲ to select another report.

Note: The records in the memory are automatically divided into groups of up to 300 lines (for the convenience of selecting the time window). Each group is marked with date and time for the first and last record. The bottom of the report will state in print **Start 4ch memory report** (start of a 4-channel report from memory). The printing order will descent from the newest reading to the oldest (the opposite of the normal print order). The report will end state at the end: **4ch memory report end**.

- **Print, Spec & programming** – printing a full status and settings report of the VLTS. Press OK for printing or ▼/▲ to select another report or press EXIT twice to return to the readings display.
- **Print, Daily min & max** – printing a Min/Max report (from last reset). Press PRINT and select with ▼/▲ the Daily min & max report. Press OK for printing or ▼/▲ to select another report or press EXIT twice to return to the readings display.

  The Min/Max data in the memory are the extreme values from continuous measurement. Therefore, they may be more extreme values than the sampling data in memory.

  The Min/Max data in memory are automatically reset every 24 hours at a fixed time. The default reset time is 8 AM.

  You can set up automatic printing every day before the reset. To set and change the **Automatic daily min/max print time and memory reset**, see "Setting Printing Time and Daily Min/Max Reset" at page 24.

  When the VLTS is set to print readings automatically, but at that same time any report is printed, then at the end of the printing of the report, the VLTS will complete printing all the value readings measured at the time of printing the report so that there will be no missing measurements in the print.

Advancing and Replacing the Printing Paper

The VLTS device uses only thermal paper for printing! The roll is 2" wide (57 mm), and printing is done only on one side, by heat instead of ink.

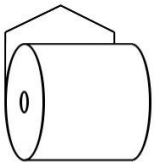
Red color on the margin of the paper roll means that the roll of paper is nearing its end. In that case, replace the paper roll before it reaches the end, so as to prevent it from jamming the printer.

To replace a roll of paper, first release the old roll:

1. Press FEED as many times as you like to advance the paper out.
2. Tear out the last printout.
3. Open the paper lid and remove the rest of the roll. If the paper is caught in the printer, cut the paper between them. Be careful not to damage the rubber roller.
4. Press FEED to remove any remaining paper from the printer.

   Note: When out of paper, if an out-of-paper alert was set, a yellow LED **NO PAPER** will turn on, the alert contact will close, the prompt **Attention! Out of paper** will be displayed, and the buzzer will go off, if so set. To mute the buzzer, press EXIT. For the readings display, press OK.
5. Before placing a new paper roll, remove a length of about 10" from it, as the zinc that it contains gradually depletes from the paper during the long exposure to heat and light.

6. Cut the end of the new roll diagonally (with a sharp end on the center).
7. Place the new paper roll in the paper housing and push the cut paper lead into the printer, under the black rubber roller. The printer will sense the paper and advance it slightly.
8. Press [FEED] while pushing the paper into the printer until the printer pulls it on its own up to the other side. After the new paper roll is in place, the buzzer alert and the **NO PAPER** prompt (if set) will turn off.



ERASING ALL THE READINGS FROM INTERNAL MEMORY

The VLTS save up to 35,040 recent values of each channel. To erase the readings:

1. Press [▼]/[▲] until you reach the **Erase all data** menu.
2. Press [OK] to confirm access to erase memory. **Enter password:** will be displayed.
3. Enter the password (4 characters consecutively). If you have not yet set a password, enter the default password: [▲], [▼], [OK], [EXIT].
4. The prompt **Please wait, erasing internal mem** will be displayed.
5. After about 6 minutes, the confirmation **All data erased from internal memory** will appear.
6. After all data is erased, the menu **Erase all data** will be displayed again.
7. Press [EXIT] to exit the menu and to display the current values.

COPYING DATA TO EXTERNAL MEMORY

When connecting an external memory device such as a **Micro-SD** card or a **USB** memory device, the VLTS will identify it and display the free memory in it within 2 seconds. For example: **USB inserted! Free: 1566304 KB** will appear on the display. If the device is full, the prompt **Memory full!** will appear.

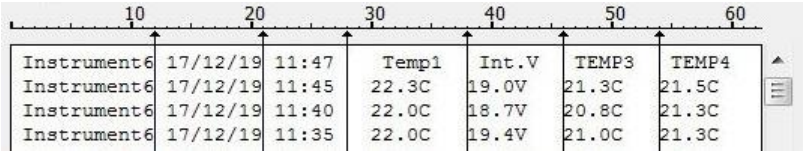
The external memory prompts will appear, if YES was entered in the following 3 alert submenus (see "*Setting up Additional Alarm Events*" see page 22):

- USB Memory Full
- SD Card Full.
- Copy Prog Print Ended

When there is available capacity in the external memory, a new text file will be created with the date and the time of interfacing as the file name. All the readings will be continuously recorded at the sampling rate. The data in the file contain: device name, names of the 4 sensors, sampling date and time, values measured by the 4 sensors and the measurement units. The file may be opened in Excel.

In **Copy to** mode, 2 files are created on the external memory. A configuration file in a TXT format, with the date and time of its creation as the file name, for example **27-11-19-20-17.TXT**, and a second file in **DAT** format, whose name begins with **memory** and includes the date and time of the last record saved in the file, for example: **memory-27-11-19-20-17.DAT**, which represents the date 27-11-19 and the time 20:17. The **DAT** file contains all the readings consecutively at the sampling rate. The data include: device name, sensor names, sampling date and time, values measured by the 4 sensors and the measurement units, and the character V or ^ is an excursion from the range was recorded. The DAT file

can be opened in Notepad or Excel, which will automatically sort out the data in columns, or the data may be sorted into columns upon the file opening, such as:



Instrument6	17/12/19	11:47	Temp1	Int.V	TEMP3	TEMP4
Instrument6	17/12/19	11:45	22.3C	19.0V	21.3C	21.5C
Instrument6	17/12/19	11:40	22.0C	18.7V	20.8C	21.3C
Instrument6	17/12/19	11:35	22.0C	19.4V	21.0C	21.3C

To get these columns in Excel:

	A	B	C	D	E	F	G
1	Instrument6	17/12/2019	11:47	Temp1	Int.V	TEMP3	TEMP4
2	Instrument6	17/12/2019	11:45	22.3C	19.0V	21.3C	21.5C
3	Instrument6	17/12/2019	11:40	22.0C	18.7V	20.8C	21.3C
4	Instrument6	17/12/2019	11:35	22.0C	19.4V	21.0C	21.3C

Copy to: VLTS has 3 ways of copying the data, as follows:

- **SD-Card** – to copy the data to a micro-SD card, scroll with ▼/▲ until you reach **Copy to SD Card** and press OK. The prompt **Please wait, copy to SD card** will appear on the display. After the copying, the prompt **All data saved to SD Card** will be displayed and printed. If the copying fails, the notification **Error while coping to SD card** will be displayed and printed.
- **USB Memory** – to copy the data to a USB stick device, scroll with ▼/▲ until you reach **Copy to USB memory** and press OK. The prompt **Please wait, copy to USB memory** will appear on the display. After the copying, the prompt **All data saved to USB memory** will be displayed and printed. If the copying fails, the notification **Error while coping to USB memory** will be displayed and printed.
- **Server** – copying data to an Internet server or portal is only possible in the VLTSC model with an active micro-SIM card installed. Using ▼/▲, select **Copy to Server** and press. OK. The prompt **Please wait, copying to Server** will appear on the display. After the copying, the prompt **All data saved to Server** will be displayed and printed. If the copying fails, the notification **Error while coping to Server** will be displayed and printed.
- **Note:** when there is no card or when copying fails, the prompt **Error while copying** will be displayed. If the printer is active, the operation notes displayed will also be printed. It is recommended to use memory devices of up to 16 GB.

ALARM INDICATORS

A VLTS/VLTSC device has 3 alarm indicators, and a VLTSC device can also be set for notification by SMS and by email through the portal. In each of the alarm events set – Alarm - **YES** – the following indicators will always be activated automatically: the **alarm relay contacts** will close, the **ALARM** light will come on and a notification will be displayed.
To delete an alert notification, press OK to confirm (does not deactivate the alarm contact).
To mute the alarm buzzer, Press EXIT (does not deactivate the alarm contact).
For "*Setting Alarm Limits to Sensor*" see page 21.
For "*Setting up Additional Alarm Events*" see page 22.

- There are alarms that activate an internal buzzer. To mute the buzzer, press EXIT or press the mute button of an external horn (optional). See "Other Connection Options" in page 8. The factory default is a muted buzzer. The buzzer muter only disconnects the buzzer! It does not affect other alarms.
- **Displayed channel** will flash when the channel send an alarm.
- **Alarm LED** – above the display, will be on to indicate any alarm event.
- **N.O. Relay contacts** – every alarm events will open/close the 1A alarm relay (it is normally open). It is possible to connect an external alarm device (not included) through the alarm relay contact. See item 4 in Image 5, see on page 8.

The following events will activate the alarm (if set)**:**

- **Disconnected sensor** – if a sensor is disconnected or not set, **ERROR** will be displayed.
- **Channel Alarm limit** – If the measured value deviates from the set maximum or minimum limit per a consecutive time period that is equal to the delay time set (if set) the alarm relay will be activated, the alarm LED will light and the internal buzzer (if set) will go off.
- **Out of paper** – If the paper in the printer runs out, an internal buzzer will go off (if set), an alert will be sent to an external device through the relay contacts (if set) and the **Out of Paper** LED will be lit.
- **Faulty sensor** – a plashing **ERROR** prompt will be displayed for the channel. The alarm LED will be lit, an internal buzzer will go off (if set) and the alarm relay will be activated.
- **Low Backup/Clock battery** – an internal buzzer will go off (if set), the alarm relay will be activated, the **LOW BATT** LED will flash, and an alert will be displayed.

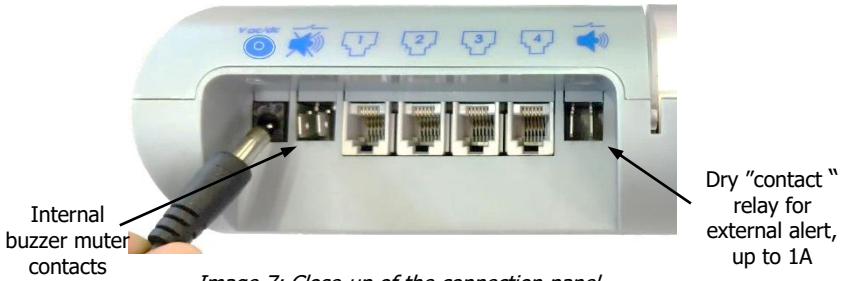


Image 7: Close-up of the connection panel

CHAPTER 4 CHANGING SETTINGS

This chapter explains how to change settings of the VLTS device. Settings are password-protected. To change settings, scroll with ▼/▲ until you reach **Settings Submenu** and press OK. When the prompt **Enter password** appears, enter the password. The factory default password is a string of 4 characters, in this order: ▲, ▼, OK, EXIT. To change the password, see "Changing the Password" at page 25. Upon exiting, or after 30 seconds without pressing any key, the settings entered will be automatically saved. A beep will sound and **Please wait saving settings** will appear on the display. If the printer is on, **Settings saved** will be printed, and the VLTS will revert to reading mode.

In VLTSC devices, settings can be changed also through the portal. See page 30.

To change settings in VLTS, follow these instructions:

1. Press ▲/▼ until the **Settings submenu** appears.
2. Press OK to enter the settings submenu. **Enter password** will be displayed.
3. Enter the password (4 characters). If you have not yet changed password, enter the default password: ▲, ▼, OK, EXIT. You will be prompted **Load configuration file**, which is the first option in the settings submenu, and which enables to load the settings from an external memory device.
4. There are 13 submenus in a VLTS device. To navigate between them, use the ▲/▼ keys. The menus can be scroll forward or backward.

These are the 13 items in the settings submenu (ascending order ▲):

- **Load configuration file** – load settings from external memory
- **Set Sensor type** – set the sensor type for each channel
- **Set Calibration** – calibrate sensors / temperature channel
- **Set Channel name** – rename channels to identify sensors
- **Set Alarms** – set alarm events and limits
- **Set Daily Min/Max Print** – set daily minimum/maximum report printout
- **Set Server** – set APN address for server
- **Set Scale/Date format** – set temperature unit and date format
- **Set Clock and Date** – set the date and time
- **Change Password** – change the password
- **Set Unit, Veh ... name** – rename unit, company and ID number
- **Set Sampling Rate –** set the sampling rate
- **External Memory Overwrite** – overwrite old data when external memory is full.

Notes:

- See a full diagram of the Operating Menu in Appendix D, page 40.
- See Default Settings in Appendix A, page 35.
- Only changed settings confirmed by pressing OK will be saved, even though by automatically exiting from the settings menu, **Settings saved** is displayed or printed.
- To select an item from the menu, press OK, and the first item will be displayed.
- Variables in the settings that can be changed but have not been selected will be marked with an *.
- To save and exit the changes in the settings, you must press EXIT.

LOADING SETTINGS FROM EXTERNAL MEMORY

Every time **Settings saved** is displayed upon exiting, the settings menu, a settings file, named **Config** is saved in the external memory (USB or micro-SD, if installed). The **Config** configuration file can be uploaded to any other VLTS device. The file does not copy ID number, date, time and calibration data.

1. To load all the settings to the VLTS from an external memory device, find the **Load configuration file** in the **Settings submenu** and press [OK].
2. **Load config. file** will be displayed, and below it, flashing, one of the following options will show: **from USB memory** or **from micro-SD card**. Select the appropriate option by [▲]/[▼] or press [OK] to confirm.

Note: If the VLTS device fails to read from the selected device, an error message will be displayed: **Reading from... failed** and the device will revert to the readings screen.

3. When loading the settings, the message **Load config. file** will be displayed for about 30 seconds.
4. After loading, the settings will be saved and **Please wait saving settings** will be displayed for about 10 seconds, after which the display will revert to the readings screen.

SETTING SENSOR TYPES

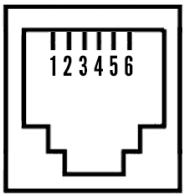
- **Temperature** – temperature sensor only
- **Humid/Temp** – an integrated temperature and humidity sensor, which sends data to 2 channels
- **Humidity** – setting an integrated temp. and humidity sensor to measure humidity only
- **Contact Switch** – on/off sensor for opening a dry contact (electric)
- **VDC 0-10Vdc** – dc voltage sensor, can be set for a unit and correlation
- **VDC 0-5Vdc** – dc voltage sensor, can be set for a unit and correlation
- **IDC 0-20mAdc** – dc voltage sensor, can be set for a unit and correlation
- **IDC 4-20mAdc** – dc voltage sensor, can be set for a unit and correlation
- **Input power** – measures the voltage supplied to the VLTS device.
- **No sensor** – channel without a sensor (the device will not read data from this channel)

The VLTS device has 4 input RJ45 ports to sensors (items 3a-d in Image 5). One sensor can be connected to each of the ports according to the following list, and the sensor must be configured accordingly.

1. Press [▲]/[▼] for the **Setting submenu**.
2. Press [OK] to confirm entering the Setting submenu. **Enter password will be displayed**.
4. Enter password (4 consecutive characters). If you have not yet changed the password, use the default password: [▲], [▼], [OK], [EXIT].
5. Press [▲]/[▼] until the **Set sensor type** menu is displayed, and press [OK].
6. The channel numbers (1-4) for selection will appear, for example **Select Channel No. 1**. To change the channel number, press [▲]/[▼] until the desired channel appears, then press [OK].
7. The sensor name, such as **Sensor 1 type** will appear, and the type of sensor set for the channel. To change the sensor type, press [▲]/[▼]. When selecting, * will appear to the right of the sensor type not yet selected. To confirm the selected sensor, press [OK], and a confirmation, such as **Channel No. 1 set**, **will appear.** To select another channel number to configure the sensor, press [▲]/[▼] or [EXIT] to exit.

8. After selecting "special" DC sensors, such as 0-10V, 0-5V, 0-20mA, 4-20mA, which measure low voltage or current, an adjustment of measured value limits to displayed limits should be set by scaling, enter a minimum and a maximum value, respectively, and select one mark for the units. When **Sensor No.1 scaling, max value:** appears, select with ▲/▼ to change the number to be displayed when a maximum value is measured. For confirmation, press OK. When **Sensor No.1 scaling, min value:** appears, select with ▲/▼ to change the number to be displayed when a minimum value is measured. For confirmation, press OK. When **Sensor No.1, measurement unit:** appears, select with ▲/▼ to change the unit to be displayed. For confirmation, press OK, and a confirmation such as **Channel No. 1 set** will appear. To select another channel number for configuring a sensor, press ▲/▼ or EXIT to exit.

On/off (dry) Contact opening sensor: connect the white wire (Pin6-Data) to the blue wire (Pin1+5V).
DC sensors (analog) such as 0-10V, 0-5V, 0-20mA, 4-20mA. Connect the black wire (Pin1-GND) to the white (Pin6-Data).
Please note: do not use a power supply of voltage higher than 24V.
Analog DC sensors may be connected to the contact sensor cable.
Note: the sensor sockets (RJ11) have 6 pins, as in the diagram below. The left pin, no. 1 in the socket, is a blue wire in the plug.



The * character in the settings screens indicate an option (not yet selected).

To exit the menu and revert to readings mode, press [x} twice. **Please wait, saving setting** will be displayed, then several seconds later, the readings screen. At the same time, **Settings saved** will be printed.

Notes: any change in the sensor type will boot the statistics in all the channels, will rename the channel and change the channel's alarm settings to the default value.

SENSOR CALIBRATION / TEMPERATURE CHANNEL

To calibrate the sensors/temperature:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
4. Press OK to confirm entry into the settings menu. The display will show **Enter password:**
5. Enter a password (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
6. Go to the **Set Calibration** menu using the ▲/▼ keys, and press OK.
7. **Select Channel No. 1** will appear, the channel number will flash. To change the channel number (1-4), press ▲/▼ and confirm with OK.
8. The current calibration value in the channel will flash, for example **Value: 0.0**.
9. Press ▲/▼ to change the magnitude of the calibration deviation for the channel, in 0.1 increments. The measurement deviation can be change in the range of from +8 to -8.
10. Press OK to confirm. **Select channel No. 1** will appear again.
11. Press ▲/▼ to calibrate another channel or twice to complete and save the changes. **Please wait, Saving Setting** will appear for a few seconds followed by the readings screen. At the same time, **Settings saved** will also be printed.

If during 30 seconds in the menu no key was pressed, **but changes were made to the calibrations**, you will exit the menu automatically. The changes will be saved and the display will revert to the readings mode.
After calibrating the temperature in the **humidity/temperature sensor**, the humidity sensor must be recalibrated (the temperature calibration automatically affects the humidity). There is no need to calibrate the contact-closing sensor.

RENAMING CHANNELS FOR SENSOR IDENTIFICATION

To set a name for each channel/sensor, go to the **Set Channel name** menu under the **Settings submenu**. Each channel/sensor may be assigned a name of up to 5 characters. The channel name can consist of Latin letters, numbers and symbols. The default channel names are: Temp1, Temp2, Temp3 and Temp4.

To change the device name (Unit name), vehicle number/installation site (Veh/obj Name) or company name (Company name). See "Renaming the Device for Identification" on page 25.

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to confirm entry into the settings submenu. **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll ▲/▼ to the **Set Channel name** menu and press OK.
5. **Select Channel No. 1** will appear. The channel number will flash. To change the channel number (1-4), press ▲/▼ and confirm by pressing OK.
6. A prompt will appear in 2 lines with the channel name, for example: **Enter sensor name: Temp1**.
7. The channel name is comprised of 5 characters. To delete the last character (Backspace), press FEED; to change the flashing character, press ▲/▼. To continue to the next character and to confirm, press OK.
8. In the end, **Select Channel No. 1** again. The number will flash.
9. Press ▲/▼ to select a channel or twice to complete and save the changes. The prompt **Please wait, Saving Setting** will be displayed a few seconds later, followed by the readings screen. At the same time, **Settings saved** will also be printed.

If during 30 seconds when the menu is displayed no key is pressed but a **change is made**, the display will revert to the readings screen and the **changes will be saved**.

To see a list of all possible characters, see Table 4 on page 26.

ALARM SETTINGS

There are 13 alarm events to be set on the **Set Alarms, Alarm type** menu.
Note: automatically, every alarm event that is set as active and takes place will be displayed, will close the alarm contact and turn on the **Alarm** led.
To change settings for alarm events, enter the **Settings Submenu** with a password! Select the **Set Alarms** submenu and select from it one of the following events to activate an alarm:

- **Channel 1,2,3,4** – setting the sensor limits: upper and delay; lower and delay
- **Power Failure** – power supply disconnected; power outage
- **Clock Battery Low** – low CR2032 clock battery
- **Backup Battery Low** – low 9V backup battery

- **End Of Paper** – no thermal paper
- **No GSM Network** – cellular communication disconnected and delay before alarm
- **Temp Over 65C** – ambient temperature above 65°C
- **USB Memory Full** – external USB memory full
- **SD Card Full** – external micro-SD memory full
- **CopyProgPrnt Ended** – message for: end of copying, data setting, & report printing
- **Sensor Error** – sensor failure
- **SMS Setting** – setting recipients, delay and repeat of SMS text messages
- **Buzzer Setting** – activate buzzer in every alarm event

If for 30 seconds no key is pressed, **changes will be saved**, **Saving setting** will be displayed, **Settings saved** will be printed, and the display will revert to the readings screen.

Setting Alarm Limits to Sensor

Channel 1,2,3,4 (**Alarm type:**) enables setting limits for every channel: temperature, humidity, voltage, etc., upper and lower, contact position and delay duration for the alarm.

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT. The first of the settings submenu, will appear on the display: **Load configuration file.**
4. Scroll with ▲/▼. Find the **Set Alarms** menu and press OK.
5. **Channel No. 1 (Alarm type:)** will be displayed. The channel number will flash. To change the channel number (1-4)/event, press ▲/▼ and press OK to confirm.
6. The event name will be displayed, for example: **Channel Alarm 1: YES**, YES will flash (Channel 1 alarm: yes/no). To change the selection YES/NO, scroll with ▲/▼ and press OK to confirm.
7. If **NO** is selected, the display will revert to event selection (Section 5). If the selection is **YES**, the line **Sensor 1 threshold high value: 30.0**, for example, will appear and will indicate the upper limit value for channel no. 1. To change the value, press ▲/▼ and OK to confirm. For a switch type (contact on/off), select **OFF** to activate the alarm.
8. If, for example, **Sensor 1 threshold high delay 0010 Min**., is shown (the value 0010 will flash), the upper limit delay time for channel No. 1 is 10 minutes. The high delay time can be set from 0 to 9,999 minutes (0000 minutes is without high delay). To change the high delay time press ▲/▼, to select, and press OK to confirm.
9. If, for example, **Sensor 1 threshold low value: 2.0** is shown, the lower limit delay time for channel No. 1 is displayed. To change the value, press ▲/▼, select, and press OK to confirm (the value must be lower than the value set for the upper limit) OK
10. If **Sensor 1 threshold low delay 0010 Min**., is displayed, (0010 value will flash) the lower limit delay time for channel No. 1 is 10 minutes. The lower delay time can be set from 0 to 9,999 minutes (0000 minutes is without low delay). To change the lower delay time press ▲/▼, to select, and press OK to confirm.
11. The name of an alarm event will reappear, for example: **Channel No. 1 (Alarm type:)**, the channel number will flash. To change the channel number (1-4) or to select another alarm event, press ▲/▼, select, and press OK to confirm.
12. To save the changes and exit the Alarm Event Setup menu, press EXIT 3 times. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

Note: When the **cursor is flashing**, a continuous pressing of the ▲/▼ when setting the upper limit, the lower limit and the delay time will run the digits in the display faster.

The **contact sensor** (SWITCH) will set off an alarm (if YES was selected) only in the OFF (open) position. It is used to set off an alarm when a door has been opened for a long time. Selecting the delay time for the sensor will be done at lower limit delay to the **Sensor x threshold low delay** channel.

Setting up Additional Alarm Events

The following events may be set to start an alarm:

- **Power Failure** – power supply disconnected; power outage
- **Clock Battery Low** – low CR2032 clock battery
- **Backup Battery Low** – low 9V backup battery
- **End Of Paper** – no thermal paper
- **Temp Over 65C** – ambient temperature above 65°C
- **USB Memory Full** – external USB memory full
- **SD Card Full** – external micro-SD memory full
- **CopyProgPrnt Ended** – end of copying and data setting, report printing
- **Sensor Error** – sensor failure
- **Buzzer Setting** – activate buzzer in every alarm event

For other alarm events:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT. **Load configuration file**, the first of the settings submenu, will appear on the display.
4. Scroll with ▲/▼. Find the **Set Alarms** menu and press OK.
5. **Channel No. 1 (Alarm type:)** will be displayed. The channel number will flash. To change the channel number (1-4)/event, press ▲/▼ and press OK to confirm.
6. The event name will be displayed, for example: **Power failure: YES**. YES will flash. To change the selection YES/NO, scroll with ▲/▼ and press OK to confirm.
7. The name of an alarm event will reappear, for example: **End of Paper: YES.** To change to another alarm event to be set, press ▲/▼, select, and press OK to confirm.
8. To save the changes and exit the Alarm Event Setup menu, press EXIT 3 times. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.
   - If during 30 seconds no key is pressed, **changes will be saved**, **Saving setting** will be displayed, **Settings saved** will be printed, and the display will revert to the readings screen.
   - To select other alarm menu items, press ▲/▼.
   - To exit each menu, press EXIT and press ▲/▼ to select other menu items.
   - To exit the settings menu and display current reading value, press EXIT twice.

Setting up SMS Alerts and Communication Failure

Only in the cellular model, VLTSC, with an active Micro-SIM card can alarm messages sent via SMS and set an alarm when communication is cut off. During the alarm, the event description will flash on the display.
This section describes the settings through the device keys. Configuration through the portal is quicker and easier. See "Chapter 5 VLTSC Portal Operation" on page 28.

- No GSM Network – cellular communication disconnected and delay before alarm.
- SMS Setting – setting recipients, delay time SMS repeat messages.

To set a communication disconnection alarm:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Set Alarms** menu and press OK.
5. Scroll with ▲/▼. Find the **No GSM network** and press OK.
6. The event name and its status will be displayed, for example: **No GSM network: YES**. YES will flash. To change the selection YES/NO, scroll with ▲/▼ and press OK to confirm. If the selection was NO, **No GSM network** will be displayed again.
7. If we selected YES, the delay time will be displayed in minutes, for example **Set delay Minutes: 5**. To change the delay time before an alert, Press ▲/▼ and press OK to confirm. The alarm will only be activated if the communication failure lasts longer than the delay time.
8. When the setting is complete, the **No GSM Network** alarm submenu displayed again.
9. For another alarm event, press ▲/▼. To save and exit, press EXIT twice. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

To set an SMS alert:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Set Alarms** menu and press OK.
5. Scroll with ▲/▼. Find the **SMS Setting** and press OK.
6. **Enter recipient 1** will appear. Press ▲/▼ to change the number, backspace to delete, press FEED to the next character and press OK to confirm.
7. The next recipient will be displayed. Do likewise to confirm all 5 recipients (even empty recipient).
8. **Number of SMS to sent: 5**, for example, will appear, in which case the alert will be sent 5 times. To change the number of alerts sent by SMS, scroll with ▲/▼ and press OK to confirm.
9. **Set delay minutes: 10,** for example, will appear, in which case the alert will be sent every 10 minutes (as long as the event is active). To change the interval, scroll with ▲/▼ and press OK to confirm.

In the example above, each recipient will be alerted (to his mobile phone) up to 5 times with SMS messages (as long as the alarm event is active), at 10-minute time intervals.

10. After setting up, the **SMS Setting** submenu will be displayed again.

11. For another alarm event, press ▲/▼.To save and exit, press EXIT twice. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

SETTING PRINTING TIME AND DAILY MIN/MAX RESET

Setting a fixed time for printing an automatic daily minimum/maximum report and resetting.

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Set Daily Min/Max Print Set Alarms** and press OK.
5. **Set Daily Min/Max Print: NO**, for example, will appear, with the **NO** flashing. To select whether to print a daily report, select YES or NO with ▲/▼ and press OK to confirm.
6. If you select YES, **Daily printing time: 00:00:00**, for example, will be displayed, denoting hour, minutes and seconds in a 24-hour clock format, with the hour flashing. To change the hour, select with ▲/▼ and press OK to confirm. Then the minute digits will flash. To change the minute, select with ▲/▼ and press OK to confirm. Repeat the same for the second and press OK to confirm.
7. **Set Daily Min/Max Print** will be displayed again. Use ▲/▼ to scroll through the menu or press EXIT twice to save the changes and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

SETTING TEMPERATURE SCALE AND DATE FORMAT

To change the temperature scale between Celsius/Fahrenheit units and the date format between European (dd/mm/yy) to U.S. (mm/dd/yy), do the following:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Set Scale/Date format** and press OK.
5. **Temperature scale: Celsius**, for example, will appear, with the Celsius flashing. To change the selection, select the desired scale with ▲/▼ and press OK to confirm.
6. In the following screen, the date format will be displayed, for example **Date format: dd/mm/yy**, with **dd/mm/yy** flashing. To change the selection, select the desired format with ▲/▼ and press OK to confirm.
7. **Set Scale/Date format** will be displayed again. Use ▲/▼ to scroll through the menu or press EXIT twice to save the changes and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

SETTING THE TIME AND DATE

To set the date and time (in a 24-hour format), do the following:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Set Clock and Date** menu and press OK.

5. Two lines will be displayed: **Change date and time.** Use ▲/▼ to change the flashing number in, for example, **15/06/2022 14:51:00** and press OK to confirm.
   * Assuming, in this example, that a European date format was previously selected.
6. **Set Clock and Date** will be displayed again. Use ▲/▼ to scroll through the menu or press EXIT twice to save the changes and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

CHANGING THE PASSWORD

To change the password for accessing the settings menu in a VLTS device, do the following:
1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Change Password** menu and press OK.
5. **Enter old password:** will be displayed. Enter the old password. Repeat the 4-character old password. Each entry of character will display another *.
6. **Confirm new password:** will be displayed. Repeat the new 4-character password. If the second string is not identical to the string entered previously, **Wrong password** will be displayed, and the new password must be reentered. If the second string is identical to the first, **Change Password** will be displayed.
7. Use ▲/▼ to scroll through the menu or press EXIT twice to save the changes and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

Note: each of the six keys may be used to enter a password, and one key may be used more than once. Make a record of the new password and secure it in a safe place for future reference.

RENAMING THE DEVICE FOR IDENTIFICATION

Each VLTS unit may be assigned 3 names: unit name, vehicle or site (Veh/obj name), and a company name.

- ▽ **Unit name** – name of the device
- ▽ **Veh/obj name** – the vehicle number or the installation sit.
- ▽ **Company name** – the name of the company

Each of these names may consist of up to 13 characters in letters and digits. Table 4 displays the characters that may be used.
For "Renaming Channels for Sensor Identification", see page 20.

To rename the device, vehicle or site and the company, do the following:
1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼ and find the **Set Unit, Veh/Obj and Company name**. Press OK.
5. **Set: Unit name** will be displayed. Use ▲/▼ to select which of the three options to rename and press OK to confirm.
6. The name you chose to change will be displayed, for example, **Enter unit name: Instrument1**, and the cursor will flash after the last character in the name.
   - ▲ Backspace - to delete the last character, press FEED.
   - ▲ To change the last character in the name, use ▲/▼

- To confirm the last character and move to the next, press OK. Repeat pressing OK until the last character.

7. **Set: Unit name** will be displayed again.
8. Use ▲/▼ to change another name or press EXIT twice to save the changes and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

If no key is pressed in 30 seconds, the menu will close, the change will be saved, and the display will revert to the readings screen.
To review the name, print a report. See "Printing on-Demand Reports" at page 12.

Table 4: Permitted characters in unit and sensor names

A	I	Q	Y	b	*j*	r	*Z*	$	,	4	<
B	J	R	Z	c	*k*	s	*{*	%	-	5	=
C	K	S	*[*	d	*l*	t	|	&	.	6	>
D	L	T	¥	e	*m*	u	*}*	‘	*/*	7	?
E	M	U	*]*	f	*n*	v	→	(	*0*	8	@
F	N	V	^	g	*o*	w	*!*	)	*1*	9	
G	O	W	`	h	*p*	x	“	*	*2*	:	
H	P	X	*a*	i	*q*	y	#	+	*3*	;	

CHANGING THE SAMPLING RATE

Measurements are read in fixed time intervals. To change the intervals (the sampling rate), do the following:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find the **Set Sampling Rate** in the menu and press OK.
5. **Sampling rate: 15 minutes,** for example, indicates a rate of 15-minute intervals, with the **15 minutes** flashing. Use ▲/▼ to change the sampling rate, from every 0.5 minute or at any value between 1 minute and 120 minutes. Pressing firmly will accelerate the display of numbers. To confirm, press OK. **Set Sampling Rate** will be displayed.
6. Use ▲/▼ to scroll through the menu or press EXIT twice to save the changes and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

OVERWRITING OLD DATA OF EXTERNAL MEMORY

The VLTS device stores internally up to 35,040 readings of recent values for each channel. When the internal memory is full, it overwrites old data in order to save new ones (this is immutable).
In external memory devices such as USB drives and micro-SD cards, there is an option of what to do when the external memory is full: overwrite old data and continue storing new data, or to stop when the external memory is full. To change the overwriting options, do the following:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.

4. Scroll with ▲/▼. Find the **External Memory Overwrite** in the menu and press OK
5. The name of the event and its status will be displayed, for example: **Memory Overwrite: Yes**, with YES flashing. To change the setting YES/NO, press ▲/▼ and OK to confirm. **External Memory Overwrite** will be displayed.
6. Use ▲/▼ to scroll through the menu or press EXIT to save the change and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

CHANGING THE DATA SERVER (PORTAL) ADDRESS

This chapter is only intended for the cellular model, VLTSC. It is for knowledgeable owners of a site/private portal who wish to direct the data from the device to their server.
The VLTSC device is set to send the data only to a Supco portal. Any change in the following details will prevent the data from reaching the Supco portal (it is recommended not to change this).
The default option is set for the following:

APN name: vipoperator
APN user: vipoperator
APN password: [none], Leave blank
Server addr: app.dev.vlts.supco.kimaia.dev
Port: 8253

To change the site's address, access through the Supco terminal or through the device:

1. Press ▲/▼ until the **Settings Submenu** is displayed.
2. Press OK to enter the settings menu, **Enter password:** will be displayed.
3. Enter a password, (4 keys in a row). If you have not yet changed your password, use the default password: ▲, ▼, OK, EXIT.
4. Scroll with ▲/▼. Find **Set Server** in the menu and press OK.
5. The APN name will be displayed, for example: **Enter APN name: vipopertaor .** The cursor will flash after the last character in the name.
   - ▽ To backspace and delete the last character, press FEED.
   - ▽ To change the last character in the name, scroll with ▲/▼.
   - ▽ To confirm the last character and move to the next one, press OK, and so on until the last character.
6. Later, the user name will be displayed, for example, **Enter APN User: vipoopertaor**, with the cursor flashing after the last character in the name. Change the User Name as in section 5 above.
7. Later, **Enter VPN password:** will be displayed, with the cursor flashing after the last character in the string. Change the Password as required.
8. Later, the Port Number will be displayed, for example, **Port: 8253**, with the cursor flashing after the last character in the string. Change the Port Number as required and press OK to confirm.
9. At the end, **Set Server** will be displayed.
10. Use ▲/▼ to scroll through the menu or press EXIT to save the change and exit the settings menu. **Please wait, Saving Setting** will be displayed, and then, several seconds later, the readings screen will revert. **Settings saved** will also be printed.

If no key is pressed in 30 seconds, the menu will close, the change will be saved and the display will revert to the readings screen.
To review the addresses that were set, print the **Spec & Programming** report. See "Printing on-Demand Reports" at page 12.

CHAPTER 5 VLTSC PORTAL OPERATION

In a portal for VLTSC devices (cellular model), you can adjust the device settings, view the sampling history, print reports, export reports to PDF and Excel files and view a location on the map. Install a micro-SIM card (not included) and connect GSM and GPS antennas when the device is turned off. After turning on, a triangle will appear in the center of the top row to indicate cellular reception, and in the center of the bottom row, a symbol for GPS reception.

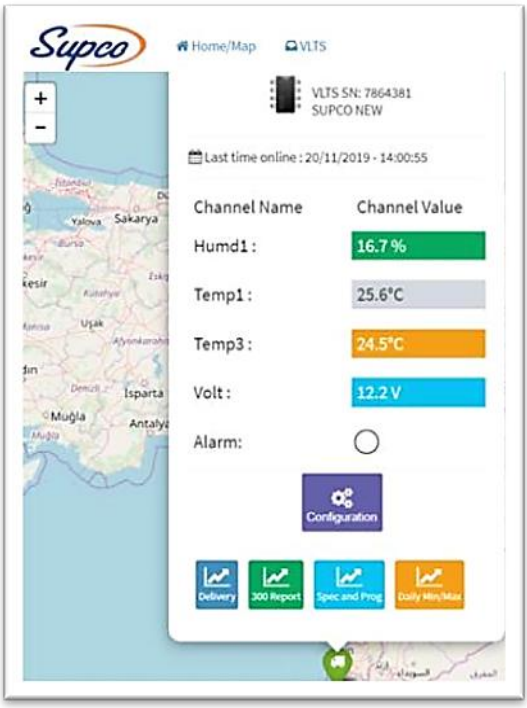
CREATING AN ACCOUNT AND REGISTERING ON THE PORTAL

1. Log in to your account at: https://app.dev.vlts.supco.kimaia.dev/
2. If you do not yet have a portal account, click **Create new account** and create a new account for you, with your email address and a password. Click **Login**.

   If you have forgotten your password for the portal, click on **Forgot password** and proceed according to the instructions.

3. After connecting, the **Home/Map** screen will open, with your units appearing as vehicles.

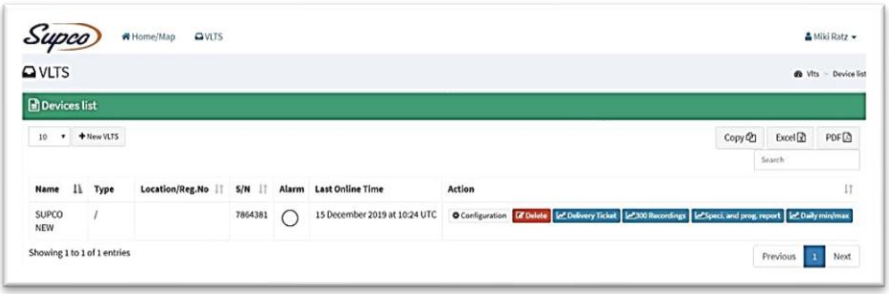
   • For a **portal on a mobile device**, set your mobile's settings: "**For computer version**"



4. In the map, you can enlarge the desired area, drag and decrease.
5. Pressing the figure will open a window of displaying: last broadcast data, alarm status and shortcuts to the settings and reports screens.
   - Green figure – a transmitting unit
   - Red figure – disconnected unit
   - If no devices have yet been introduced, no vehicle figures will appear on the map.
   - The unit number (VLTS ID) and the unit name will appear at the top of the figure window.
6. To view the **VLTS Device list**, click **VLTS** at the top of the screen.
7. A **Device list** screen will open with all the devices registered in.

- You can select the number of devices to display on each page.

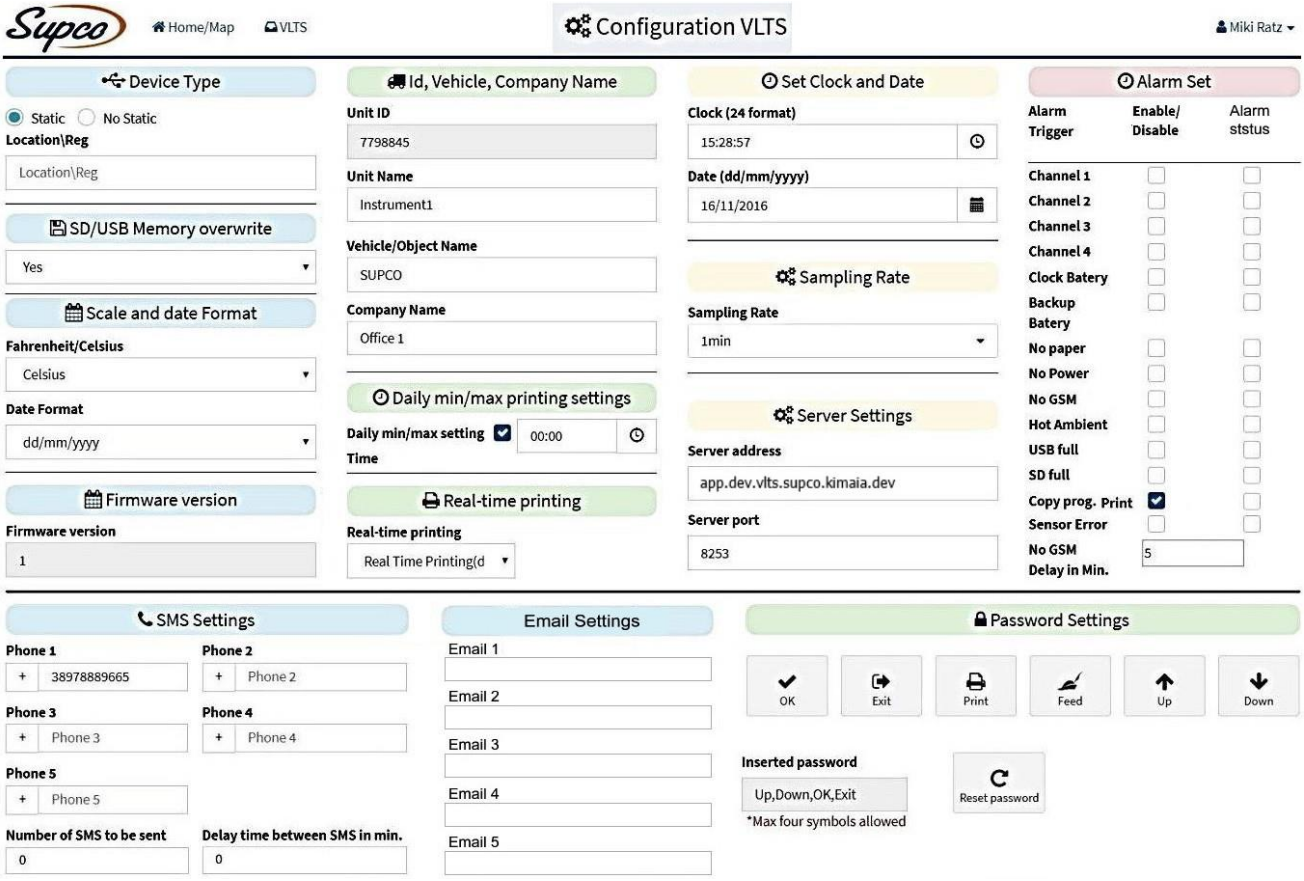
8. To add a new device, click **+New VLTS**
9. Enter the ID number of your device and click **SAVE**
   - To view the device ID number: on the screen, click ▲ on your device.
   - Each device can only be registered in one user account!
   - **Note:** it is not possible to change the device's **Buzzer** settings from the portal.
   - **The SMS** alert is sent directly from the device
   - **Emails** are only sent from the portal after the data has been received (not less than 10 minutes)
10. All the ID devices in your account will be listed on the **Device list** screen, where you can see details such as: alarm status, view reports and export them to a PDF or EXEL file



SETTINGS, REPORTS AND EXPORTING DATA IN THE PORTAL

To perform tasks on the portal, use the following **Action** buttons:

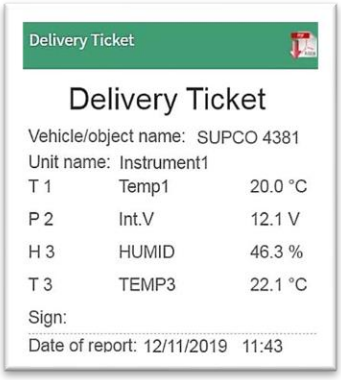
- ▲ **Configuration** – See Configuration page to an online device setting at page 30.
- ▲ **Delete** – deleting the device from your account/ devices list at the portal.
- ▲ **Delivery Ticket** – displaying the last reading report received in the portal.
- ▲ **300 Recordings** – displaying a 300 records/samples report from a list of time intervals.
- ▲ **Speci. and prog. Report** – displaying a report of all the settings on the device.
- ▲ **Daily min/max** – displaying a minimum/maximum report from last reset.


Supco
Home/Map
VLTS
Configuration VLTS
Miki Ratz
Device Type
Static
No Static
Location\Reg
Location\Reg
SD/USB Memory overwrite
Yes
Scale and date Format
Fahrenheit/Celsius
Celsius
Date Format
dd/mm/yyyy
Firmware version
Firmware version
1
Id, Vehicle, Company Name
Unit ID
7798845
Unit Name
Instrument1
Vehicle/Object Name
SUPCO
Company Name
Office 1
Daily min/max printing settings
Daily min/max setting
00:00
Time
Real-time printing
Real-time printing
Real Time Printing(d
Set Clock and Date
Clock (24 format)
15:28:57
Date (dd/mm/yyyy)
16/11/2016
Sampling Rate
Sampling Rate
1min
Server Settings
Server address
app.dev.vlts.supco.kimaia.dev
Server port
8253
Alarm Set
Alarm Trigger
Enable/ Disable
Alarm ststus
Channel 1
Channel 2
Channel 3
Channel 4
Clock Batery
Backup Batery
No paper
No Power
No GSM
Hot Ambient
USB full
SD full
Copy prog. Print
Sensor Error
No GSM Delay in Min.
5
SMS Settings
Phone 1
+ 38978889665
Phone 2
+ Phone 2
Phone 3
+ Phone 3
Phone 4
+ Phone 4
Phone 5
+ Phone 5
Number of SMS to be sent
0
Delay time between SMS in min.
0
Email Settings
Email 1
Email 2
Email 3
Email 4
Email 5
Password Settings
OK
Exit
Print
Feed
Up
Down
Inserted password
Up,Down,OK,Exit
*Max four symbols allowed
Reset password

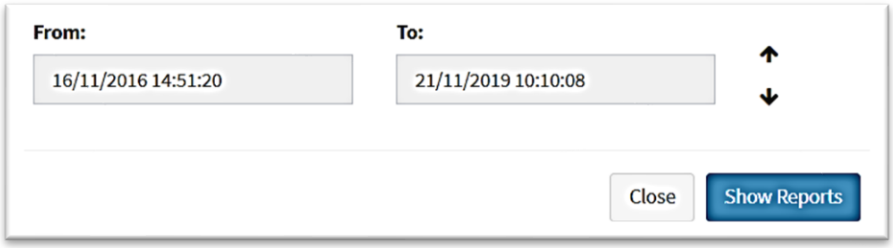
At the end, click the **Update Configuration** at the bottom. After about 5 seconds, the device will display: **Please wait, Saving Setting** and **Setting Saved** will also be printed.

1. **Delivery Ticket** – last measurement report received in the portal (date and time of reading are indicated below).

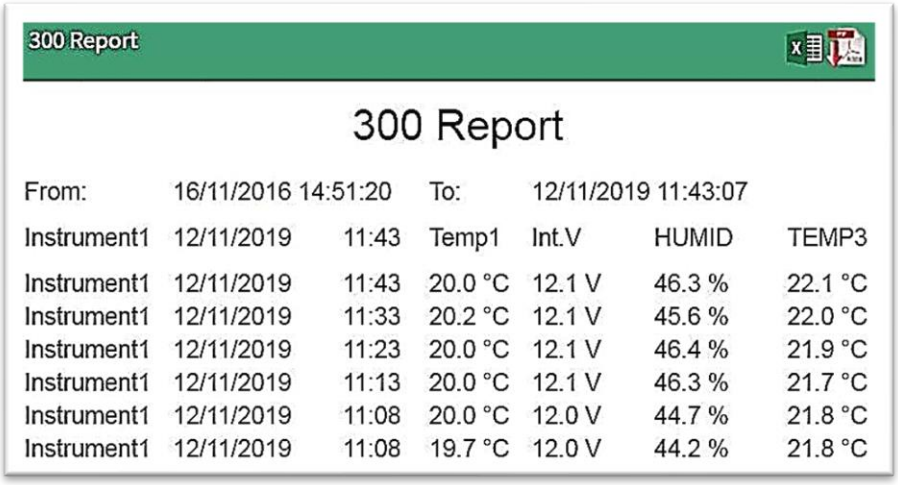
- This report can also be printed in real time, directly on the device. See "Printing on-Demand Reports" at page 12.
- The measurements are sent to the portal according to the sampling rate in the device, but not less than every 10 minutes. That is: even if the sampling rate in the device is 1 minute, only every 10 minutes will one record be read on the portal.



2. **300 Recording** - Displays a report of up to 300 records. Select with the arrows a report according at preset time cut points, and click **Show Reports** for confirmation. The report can also be printed directly on the machine, see "Printing on-Demand Reports" at page 12.



An example for the beginning of a report (descending in time). On the right are the buttons for exporting.

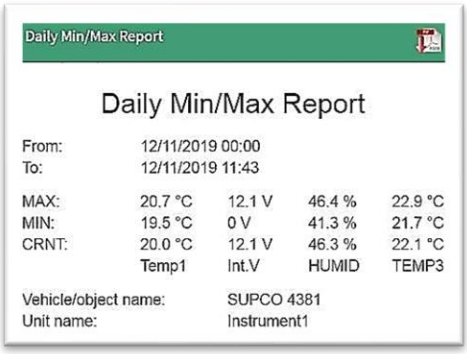


3. **Specification and prog. Report** A report of all the settings on the device, divided into categories:

- General system settings
- Device details
- Alarm settings
- Settings for SMS recipients
- Server settings (for portal)
- Sensor settings, measuring range, warning, delay and calibration thresholds
- It is recommended to keep a copy of the settings after each update, in order to check if we have set it correctly or changed something in error.
- The report can also be printed directly on the device printer. See page 12.
- The setting of the recipients of the email alerts will not appear in this report, as they are located and set up only in the portal.

4. **Daily min/max** – displays the minimum and maximum report from the last reset and the last measurement in the line **CRNT**.

- Last reset time appears in **From**
- The report can also be printed directly on the device. See page 12.

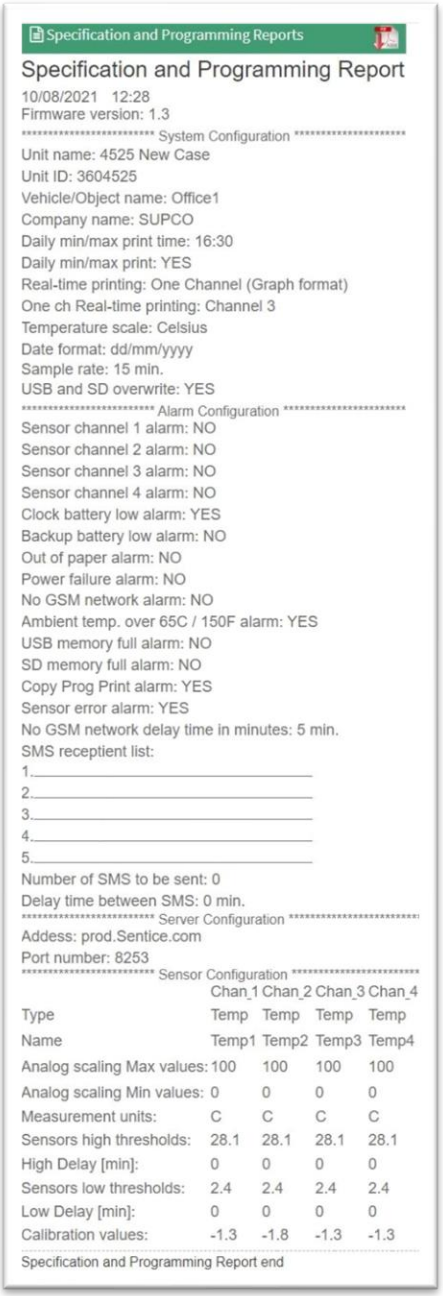


Daily Min/Max Report

Daily Min/Max Report

From:	12/11/2019 00:00			
To:	12/11/2019 11:43			
MAX:	20.7 °C	12.1 V	46.4 %	22.9 °C
MIN:	19.5 °C	0 V	41.3 %	21.7 °C
CRNT:	20.0 °C	12.1 V	46.3 %	22.1 °C
	Temp1	Int.V	HUMID	TEMP3

Vehicle/object name: SUPCO 4381
Unit name: Instrument1



Specification and Programming Reports

Specification and Programming Report

10/08/2021 12:28
Firmware version: 1.3

********** System Configuration **********
Unit name: 4525 New Case
Unit ID: 3604525
Vehicle/Object name: Office1
Company name: SUPCO
Daily min/max print time: 16:30
Daily min/max print: YES
Real-time printing: One Channel (Graph format)
One ch Real-time printing: Channel 3
Temperature scale: Celsius
Date format: dd/mm/yyyy
Sample rate: 15 min.
USB and SD overwrite: YES

********** Alarm Configuration **********
Sensor channel 1 alarm: NO
Sensor channel 2 alarm: NO
Sensor channel 3 alarm: NO
Sensor channel 4 alarm: NO
Clock battery low alarm: YES
Backup battery low alarm: NO
Out of paper alarm: NO
Power failure alarm: NO
No GSM network alarm: NO
Ambient temp. over 65C / 150F alarm: YES
USB memory full alarm: NO
SD memory full alarm: NO
Copy Prog Print alarm: YES
Sensor error alarm: YES
No GSM network delay time in minutes: 5 min.
SMS receptient list:
1.
2.
3.
4.
5.
Number of SMS to be sent: 0
Delay time between SMS: 0 min.

********** Server Configuration **********
Addess: prod.Sentice.com
Port number: 8253

********** Sensor Configuration **********

	Chan_1	Chan_2	Chan_3	Chan_4
Type	Temp	Temp	Temp	Temp
Name	Temp1	Temp2	Temp3	Temp4
Analog scaling Max values:	100	100	100	100
Analog scaling Min values:	0	0	0	0
Measurement units:	C	C	C	C
Sensors high thresholds:	28.1	28.1	28.1	28.1
High Delay [min]:	0	0	0	0
Sensors low thresholds:	2.4	2.4	2.4	2.4
Low Delay [min]:	0	0	0	0
Calibration values:	-1.3	-1.8	-1.3	-1.3

Specification and Programming Report end

CHAPTER 6 SOLVING PROBLEMS

Table 5 below lists the most common problem and the ways to solve them.

ISSUE	PROPOSED SOLUTION
The device does not turn on when OK/On is pressed	• Make sure there power is supplied to the device. • Wait 5 seconds after OK/On is pressed.
The device display turns on shortly when OK/On is pressed and the Power LED is blinking	• The device is working on the backup battery only, make sure there power is supplied to the device. • Replace the external power adaptor if connected. Should be 12V, 2A
No printing or weak printing	• Change the print mode from Disable to another style. See "Printing", page 11. • Make sure you are using thermal printing paper. • Replace the print side of the thermal paper or replace the paper roll to thermal paper. • Move the VLTS device to a place where the temperature is in the range of -18ºC to 65ºC
Paper waste/ Cancel printing	• Change the printer to **Disable** mode. See "Printing", page 11.
Wrong date or time	• Change the date or time. See "Setting the Time and Date" on page 24. • Make sure the date is in the correct format. See "Setting Temperature Scale and Date Format": on page 24. • Replace the CR2032 clock battery. See "Installing and Replacing the Batteries" on page 9. • Remove the batteries, the CR2032 3V and 9V and pull out the power cord for 5 minutes, then reinstall them. See page 9.
Incorrect sampling rate	• See "Changing the Sampling Rate", page 26.
Sensor type not set	• See "Setting Sensor Types", on page 18.
Buzzer annoys	• To mute the buzzer one time, press on EXIT. • To turn off the horn completely, see "Setting up Additional Alarm Events", set the buzzer to **No**, page 22.
No alarm when the temperature is out of range	• Check "Setting Alarm Limits to Sensor" and the delay time, page 21. • Check that the buzzer is set to YES. See "Setting up Additional Alarm Events", page 22.
Incorrect device/ vehicle name or sensor name	• See "Renaming the Device for Identification", page 25. • See "Renaming Channels for Sensor Identification", page 20.
Can't erase the last character we'll entering names	• To backspace and delete the last (flashing) character, press FEED
Forgot your password?	• Enter the factory default password: ▲, ▼, OK, EXIT. • Update password. See "Changing the Password", page 25.

APPENDIX A DEFAULT SETTINGS

To reset setting to factory defaults, do the following:

1. Turn off the device, disconnect the backup battery and the power supply.
2. Hold down FEED and connect the power supply.
3. After about 6 seconds, the display will turn on. Release FEED.
4. All the menu settings will revert to the factory settings and the readings will be displayed.

Note: Restoring defaults does not delete records.

Recommended: print and save the **Print, Spec & Programming** settings report after every change in the settings. See "Printing on-Demand reports", page 14.

Table 6 lists the VLTS default settings.

Table 6: Default settings

GENERAL DEVICE SETTINGS			
Min/max print time [See page 24]	Daily min/max print [See page 24]	Sampling Rate [See page 26]	Real-time printing [See page 11]
08:00	Yes	15 Min.	No
Password (default) 4-character string from left to right [See page 25]	Company Name 13 characters [See page 25]	Vehicle/ Object Name 13 characters [see page 25]	Unit Name 13 characters [See page 25]
▲ ▼ OK EXIT	SUPCO	Office1	Instrument123
Sensor Error Alarm [See page 22]	Overwrite SD/USB [See page 26]	Date Format [See page 24]	Fahrenheit/ Celsius [See page 24]
Yes	Yes	dd/mm/yyyy	Celsius

Buzzer enabled:	Yes	Internal buzzer activation	**General alarm events** [page 22]
Clock Bat.	Hot ambient 65^{0}C	No paper	USB full
Yes	Yes	No	No
Backup bat.	Copy prog	No Power	SD full
Yes	Yes	No	No

Sensor Setting				
Channel	1	2	3	4
Sensor Name 5 characters [page 20]	Temp1	Temp2	Temp3	Temp4
Set Sensor Type [See page 18]	Temperature	No Sensor	No Sensor	No Sensor
Sensor Calibration [See page 19]	0.0	0.0	0.0	0.0
Alarm for Chanel [See page 21]	**Yes**	**No**	**No**	**No**
High alarm threshold	8.1	8.1	8.1	8.1
High delay min.	0	0	0	0
Low threshold	2.4	2.4	2.4	2.4
Low delay min.	0	0	0	0
Analog scaling Max.	100	100	100	100
Analog scaling Min.	0	0	0	0
Analog default units	s	s	s	s

SMS alert settings and communication failure for VLTSC only [see page 25]			
No GSM network alarm	No GSM Alarm delay	No. of SMS to sent	Delay between SMS
No	5 Min.	0	0 Min.

Device settings for Supco VLTSC only [see page 35]			
APN name/ APN user	APN password	Server address	Port
vipoperator	[none]	app.dev.vlts.supco.kimaia.dev	8253

APPENDIX B TECHNICAL SPECIFICATIONS

Table 3: Technical Specifications

Feature	Details
display	Digital LCD, 2 lines x 20 digits, 15 X 65 mm
Main operating voltage	10 – 30 Vdc
Alternate operating voltage	Power adaptor 12V AC/DC, 2 Amps
backup battery	1200mAh 9V battery (not supplied) lasts for 48 hours
Clock battery	Lithium 3V battery (supplied), lasts for 3 years
Working temperature	-18°C to +65°C without condensation
Storage temperature	(-40°F to +150°F) -40°C to +65°C
Operation in relative humidity	0 to 95% without condensation
response time	Temp: 5-30 seconds. Humidity: 6-10 seconds. Contact closure: 1 second.
Contact current alarm relay	1 Amps, 12V AC/DC
Thermal paper roll width	57 mm (2 inches)
Thermal paper roll length	40 feet, enough for 12,480 lines in small print
Dimensions	W 232 x D 168 x H 65 mm (9.13x6.61x2.56 inches), 1.8 kg
Wight	VLTS, 570gr/ VLTSC, 585gr with 1 paper roll, clock batt. without: sensors
Temperature sensor	**VLTPROBE electronic sensor**
Temperature measuring range	-40°to+130°C ±0.5°C (40°F to +266°F ±1.0°F)
Reading and display resolutions	(0.2°F) 0.1°C
Temperature sensor diameter	(0.25") 6.35 mm
Temperature sensor length	10 meters (33 ft.), extendable to 30 meters (100 ft.)
Temperature/humidity sensor	**VLTHSPROBE electronic sensor**
Measurement range	Temperature: -40°C/+130°C (-40°F /+266°F ±1.0°F); Humidity: 0-100%
Measurement accuracy	Temperature: ± 0.5°C, Humidity in the range 10.0%-89.9%: ±2%; other: ±4%
Reading and display resolutions	(0.2°F) 0.1°C; Humidity: 0.1%
Temperature/ humidity sensor diameter	14mm (0.55")
Temperature/ humidity sensor length	10 meters (33 ft.), can be extended up to 30 meters (100 ft.)

Modem (internal)	Details
Frequency Bands	900/2100MHz@UMTS 900/1800MHz@GSM
Approval	CE/GCF/FCC/IC/ICASA/PTCRB/AT&T/Rogers

Integrated GSM/GPS antenna	Details
Center Frequency	1575.42±1.02MHz
V.S.W.R	1.5:1
Band Width	>10MHz MHz
Impedance	50 ohm
Polarization Type	R.H.C.P
LNA/Filter	
Frequency Range	1575.42MHz±1.02MHz
LNA Gain (w/o cable)	27 dB Typical
Noise Figure	1.5 dB
Voltage & Current	3.0~5 Vdc, 13.5 mA
GSM Antenna	
Frequency Range	806~960/1710~2170(MHz)
V.S.W.R	2.0:1
Impedance (ohm)	-1dBi@900 1dBi@1800
Peak Gain (w/o cable)	2 dBi
Azimuth	Omni-directional
Polarization Type	Vertical or Horizontal
Mechanical	
Mounting	Adhesive
Size	Diameter 78*15 mm
Cable	RG174, 2m
GSM & GPS Connectors:	SMA straight male
Working Temp.	-40℃~+85℃
Humidity	55%~75%RH
Waterproof	IP68

GPS module (internal)	Details
L1 Band Receiver (1575.42MHz)	22 (Tracking) / 66 (Acquisition)
High sensitivity:	-165dBm@Tracking, -148dBm@Acquisition
GPS + QZSS (USA + Japan)	
Anti-Jamming	

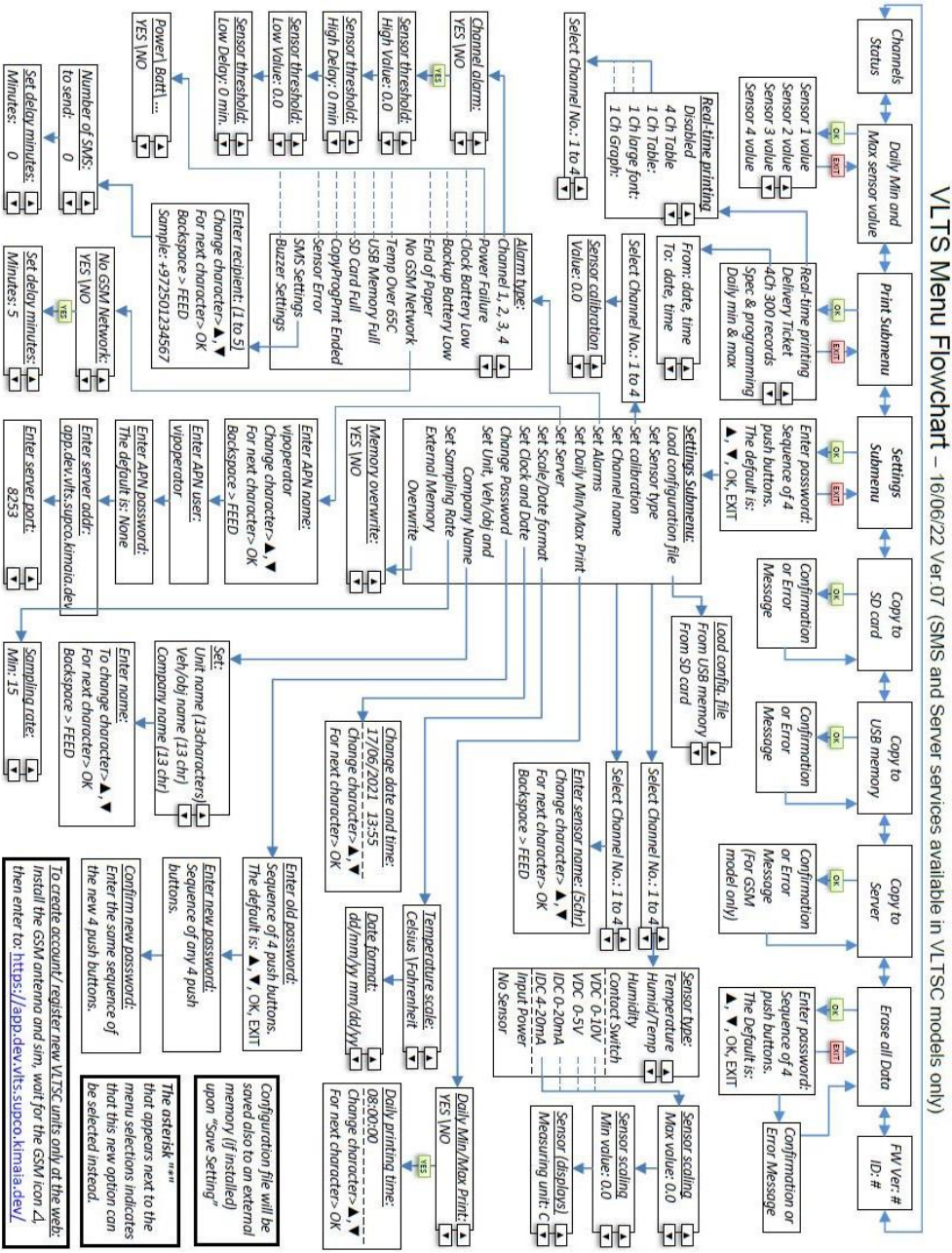
APPENDIX C ACCESSORIES

Table 8 below lists the accessories in the package and additional optional accessories.

Table 8: Accessories

DESCRIPTION	VLTS	VLTSC	PART NUMBER
VLTS 4-channel recorder and printer	1	1	
GSM/GPS cellular modem	-	Internal	
GSM/GPS integrated cellular antenna and 3 meter wire	-	1	VLANT
GSM "finger" antenna for VLTSC	-	Optional	VLGSM
GPS "finger" antenna for VLTSC	-	Optional	VLGPS
10 m. temperature sensor	1	1	VLT PROBE
20 m. temperature sensor	Optional	Optional	VLT PROBE20
30 m. temperature sensor	Optional	Optional	VLT PROBE30
10 m. temperature and humidity sensor	Optional	Optional	VLTSHPROBE
20 m. temperature and humidity sensor	Optional	Optional	VLTSHPROBE20
10 m. cable (for contact or analog sensor) For contact sensor (connect between blue and white) For analog sensor (connect between GND black and white data)	Optional	Optional	VLS CABLE (143168)
A roll of thermal paper, 57 mm wide, 40 m. long	2	2	VLPAPER
230V AC to 12V AC transformer, European plug.	1	1	VL230
3V Lithium battery for clock and memory	1	1	VLBAT
Operating booklet in English	1	1	VLSMANUAL
Operating booklet in Hebrew	Optional	Optional	VLSMANUALH
Paper lid	Optional	Optional	VLSPACO
CR2032 battery housing cover	Optional	Optional	VLSBACO
9V battery housing, drawer	Optional	Optional	VLS9VCO
IP65 box, clear, and lock, 25x25x10 cm	Optional	Optional	VLWPCASE
Remote alarm indicator and mute kit, 5 m.	Optional	Optional	VLSK
Extension for sensor 10 m. long	Optional	Optional	CABLE 33H
Automatic alarm dialer (connects to phone line)	Optional	Optional	ADTA 220
Power cable with DC plug (for operation in vehicle)	1	1	143175

APPENDIX D OPERATING MENU



VLTS Menu Flowchart – 16/06/22 Ver.07 (SMS and Server services available in VLTSC models only)