# b.Alert TPMS V2 manual

# 1. INTRODUCTION

Thank you for purchasing a b.Alert system.

You now possess a superior technology to follow up your tyres, organize the maintenance, reduce calamities and have some important gains in less wear and less fuel consumption.

The communication with the units goes through a website. This manual explains the functionality of the site and the units. We aimed at creating a site that is as user friendly and as self-explaining as possible.

## 2. TABLE OF CONTENTS

# 3. WORKING PRINCIPLE

## 3.1. THEORY

The pressure in tyres needs a continuous monitoring to detect leakages and prevent subsequent standstills of the vehicles.

However, the pressure in a tyre fluctuates mainly in function of the temperature of the air or the gas ($N_2$) in the tyre. And this temperature fluctuates for different reasons, mainly the external temperature and the friction of the tyre on the pavement during driving. Hence, the pressure fluctuates in function of the driving of the vehicle.

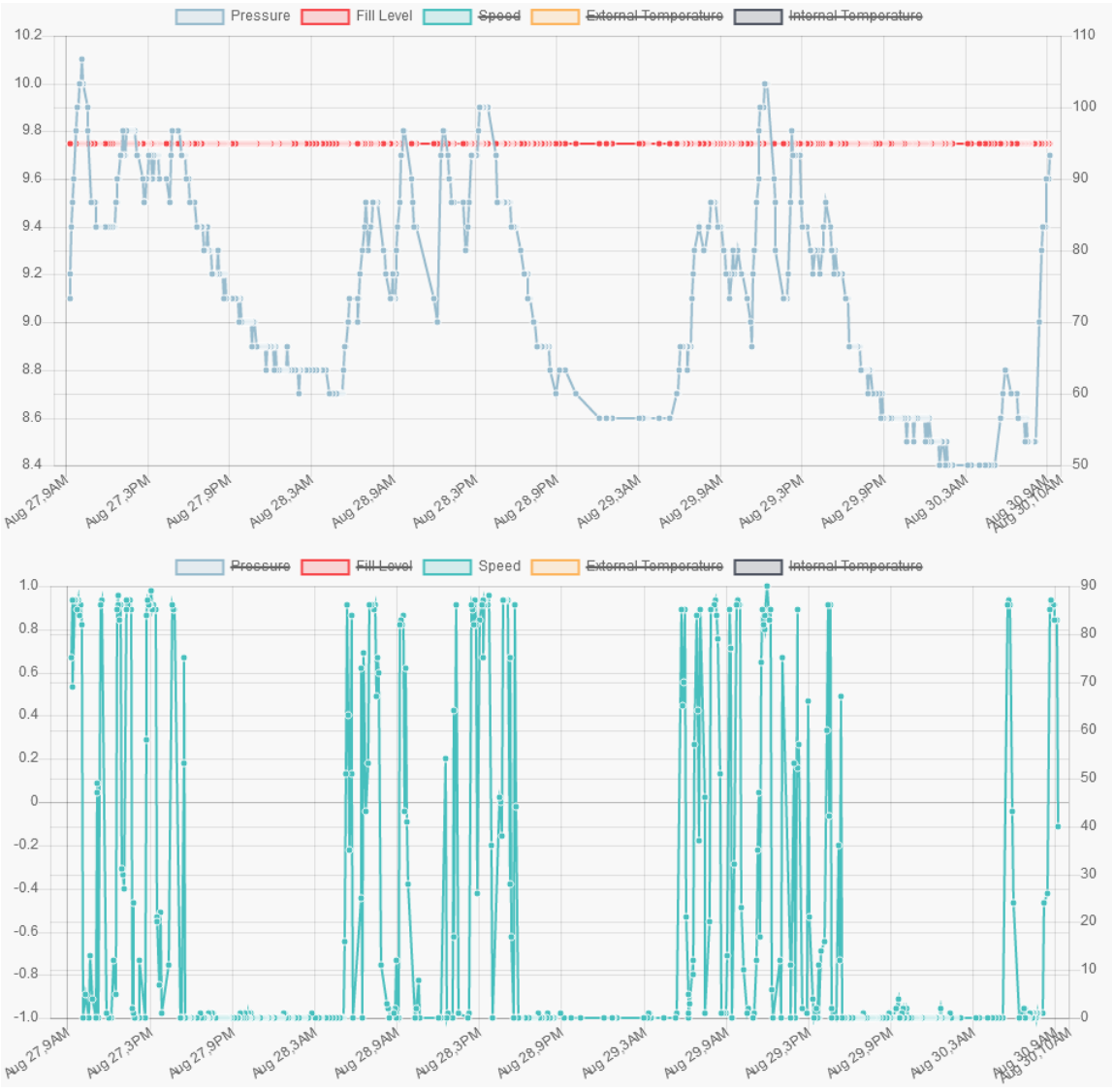


**Figure 1 pressure in function of speed**

On Figure 1 a real measurement is shown. The pressure fluctuates, mostly in function of the speed, but also with the cooling down of the night, between 8.4 bar and 10.1 bar. A difference of 1.7 bar!

So, pressure measurements are a bad predictor to know if the filling with gas or air in a tyre is at a good level or, if a leak exists.

For this reason, b.Alert TPMS V2 works with the **fill level** in a tyre.

It is indicated as a percentage of the optimal filling. On Figure 1, it is the red line and it is clearly shown that driving or not driving or the temperature has no influence on the fill level.

It is also a very intuitive parameter. A fill level of 90% means that there is a loss of 10% in air or gas, a fill level of 50% means that half of the air or gas is lot.

## 3.2. RELATION WITH SETTINGS

It is practically not possible to know the filling of a tyre in absolute terms. This would imply that we can count air or gas molecules.

However, as the pressure is a function of the fill level and the temperature, it is possible to calculate a relative fill level in percentages, based on the optimal pressure at a refence temperature. This optimal pressure is also a standard decision for tyre technicians. It is the first and most important parameter to enter in the settings.

# 4. WEBSITE AND LOGIN

## 4.1. LOGIN

The service is a web service. It can be found on tpms.balert.net.

## 4.2. SCREEN LAY-OUT

When logging in, the system starts with an overview of all vehicles under the main menu.

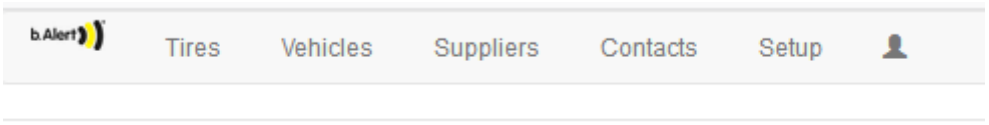


Figure 2 main menu

The main menus are “tires”, “vehicles” and “setup”.

## 4.3. VEHICLES

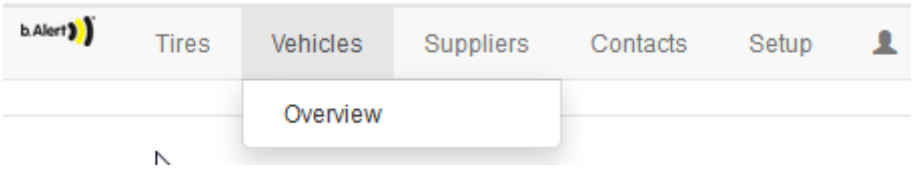


Figure 3 menu vehicles

The vehicles menu gives a list of all vehicles defined on your platform. The vehicles indicated in red are those with a tyre in an alarm situation. The vehicles indicated in yellow are those with a tyre that needs inflation. The white lines are vehicles without problems.

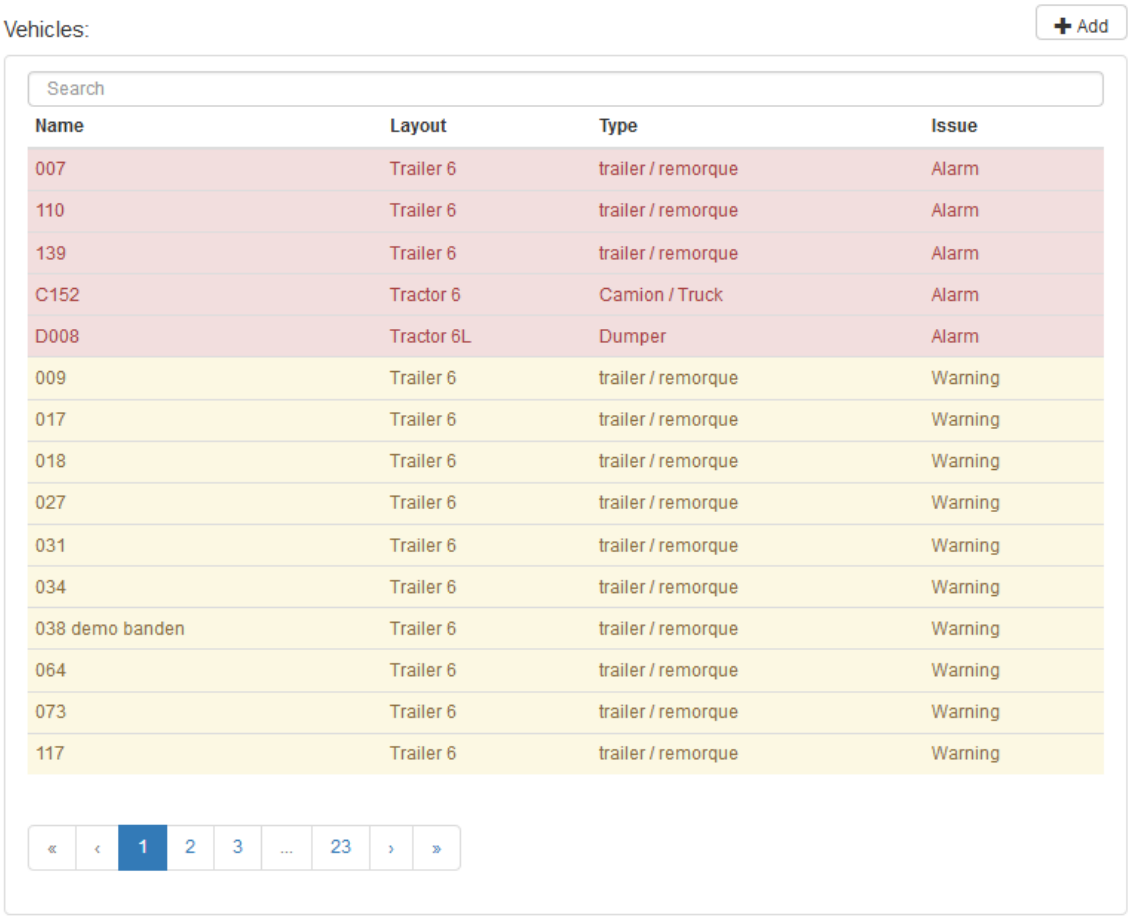


**Figure 4 list of vehicles**

It is possible to sort the list by clicking on the titles in the columns.

The search function is a very powerful function. It selects on the whole line. So, it is possible to select a problem type, 1 vehicle, a group of vehicles, a type of vehicle, ….

Clicking on one line opens the details of the vehicle.

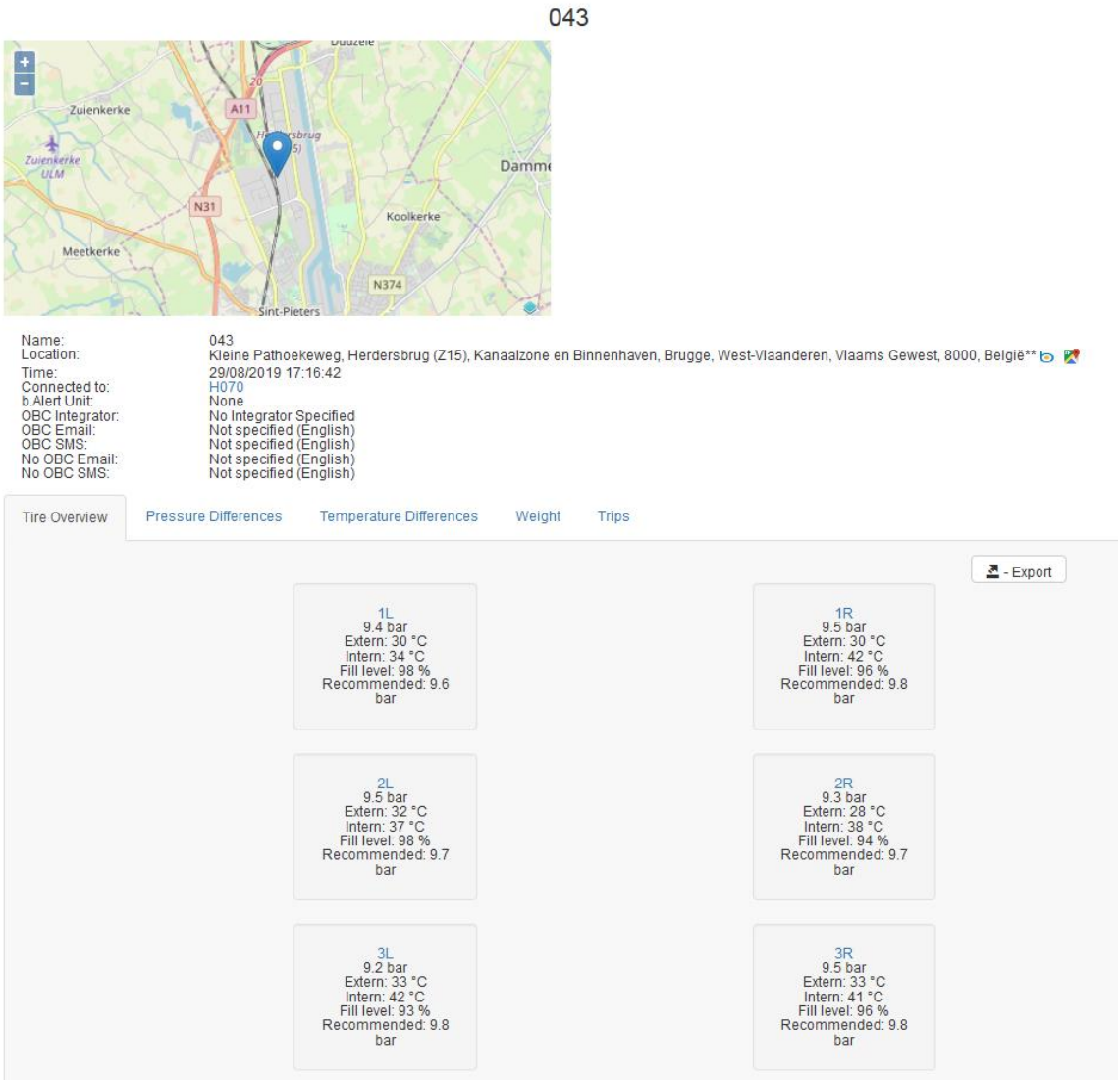


**Figure 5 vehicle details**

Every vehicle has a name. it is defined by the user and is an open field. Users are free to choose for id numbers, number plates, the name of the fixed driver, …. It does not need to be unique, but this is of course advised.

The location of the vehicle is determined in one of three ways:

- When this is a vehicle has a b.Alert TPMS V2 unit mounted, it is the real time position of the vehicle
- When this is a vehicle without its own b.Alert TPMS V2 unit , connected to a vehicle with its own b.Alert TPMS V2 unit, it is the real time position of the vehicle
- When this is a vehicle without its own b.Alert TPMS V2 unit, not connected to a vehicle with its own b.Alert TPMS V2 unit, it is the last position where the vehicle was coupled.

The time is the last date and time, the vehicle was seen.

Based on the signals of the sensors seen by a b.Alert TPMS V2 unit, the system detects automatically which combination of vehicles exist. For instance, tractor/trailer combinations.

The b.Alert unit is the name of the unit which is installed on this vehicle, if a unit is installed.

The OBC parameters are used to send messages to onboard computers for vehicles with an onboard computer.

Under the information about the vehicle, the lay-out of the vehicle is given with the basic values for every tyre.

The lay-out is defined when creating a vehicle and reflects the relative position of the tyres on the vehicle. These blocks are grey, yellow or red in function of the need to inflate (yellow) or an alarm situation (red).


Figure 6 basic tyre info

On top of every tyre, the name of the position is given. Clicking here gives the details for this tyre.

## 4.4. TYRES

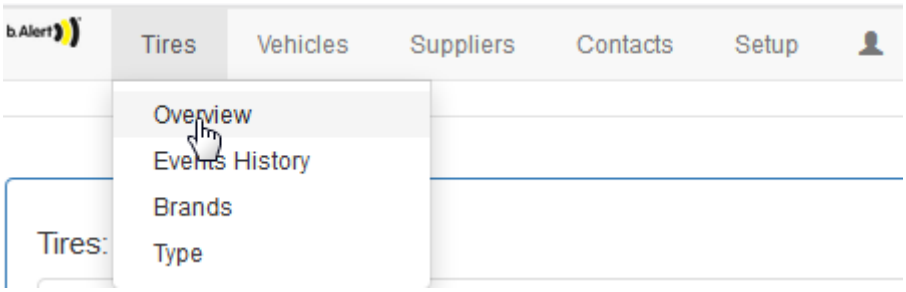


Figure 7 overview of tyres

The tyre overview gives a list of all tyres. Those in red are in an alarm situation, those in yellow need inflation and the white ones are ok.

Tires:

Search

| Vehicle | Position | Name | Issue | Fill Level |
|---|---|---|---|---|
| H078 | front right | band trekker 96 4 | Warning | 90 % |
| D001 | | D001-1tro | Warning | 89 % |
| D001 | | D001-2TLo | Warning | 90 % |
| D001 | | D001-2TRo | Warning | 89 % |
| 027 | 1L | O12-LV | Warning | 86 % |
| 031 | 1L | O4-LV | Warning | 88 % |
| H034 | front left | T11-LV | Warning | 89 % |
| H034 | front right | T11-RV | Warning | 87 % |
| 007 | 1L | 007 1L | | 93 % |
| 007 | 1R | 007 1R | | 97 % |
| 007 | 2R | 007 2R | | 95 % |
| 007 | 3L | 007 3L | | 95 % |
| 186 | 3L | 186 LA | | 96 % |
| 186 | 1L | 186 LV | | 98 % |
| 186 | 3R | 186 RA | | 98 % |

Figure 8 overview tyres

In the overview by clicking on the column name, the results can be sorted. The columns give the vehicle name, the tyre position on that vehicle, the name of the tyre, if there is an issue and the fill level.

The search function is a strong function that selects on all values in a line. This makes it possible to select only the tyres of 1 vehicle, those with the same position, …

Clicking on a tyre gives the details of this one tyre.

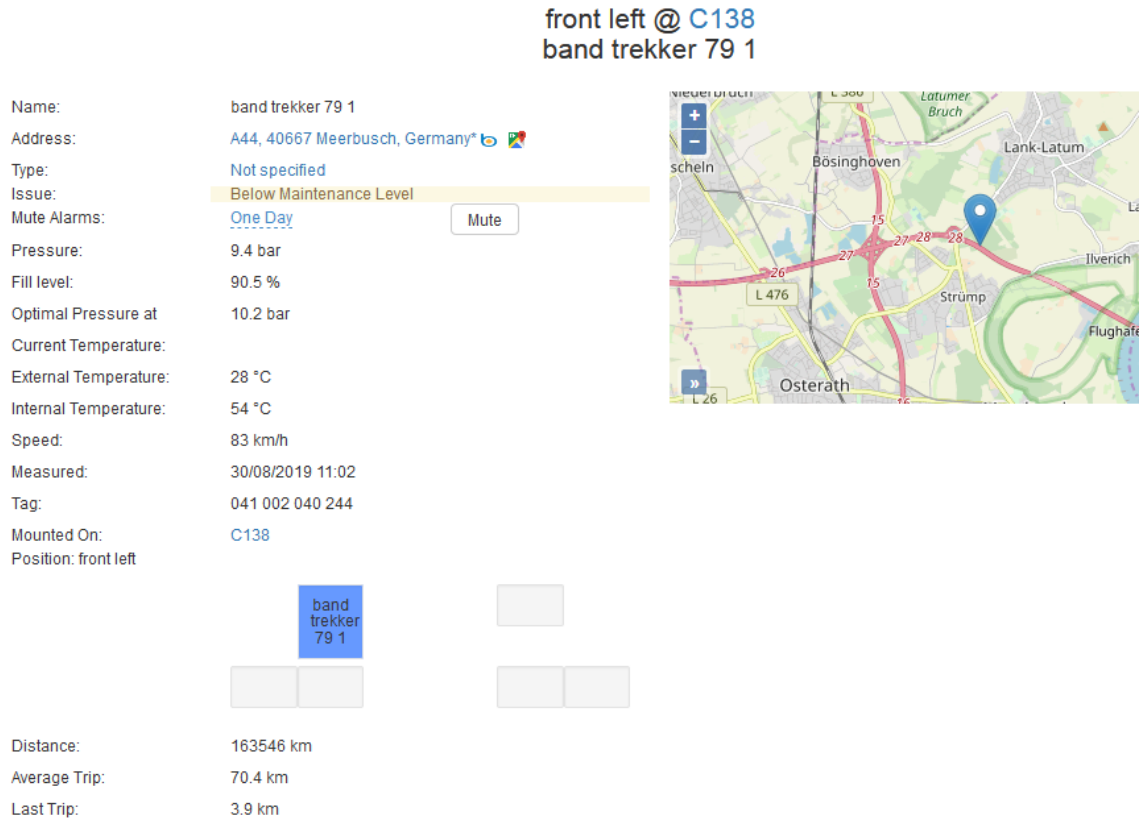


Figure 9 details of a tyre

The name of the tyre ca be chosen freely by the user. For all daily communication it is not used, but the name of the position on the vehicle and the name of the vehicle is used. This is much more intuitive for the user.

The position is the position of the last measurement of the tyre.

If there is an issue, it is indicated here in red or yellow with a detailed description of the issue.

The current pressure, fill level, external temperature and internal temperature are given.

As one needs to inflate a tyre based on a pressure measurement and this optimal pressure is function of the temperature, it is necessary to give the optimal pressure at the current temperature. When the tyre is inflated, this pressure needs to be used.

However, in some situations the measurement values are too old. In this case we do not know what the current temperature is, and we do not give an optimal pressure.

When the tyre is on a driving vehicle, the speed is given.

The data is the date and time for the last measurement.

Every b.Alert TPMS V2 sensor on the tyres has a serial number. This is given here.

A simple scheme shows the relative position of the tyre on the vehicle.

The usage statistics of a tyre are kept. This is the distance driven with the tyre, the distance of the last trip and the average trip. This is important, as the average trip length and the total distance driven are determining the wear on the tyre.

An important function is the **mute** function on top of the screen. When a tyre has an alarm situation, at a defined frequency in function of the gravity of the situation, the alarms will be sent. There can be situations, where it is no necessary anymore to send the alarms. With this button they can be muted for a day or a week.

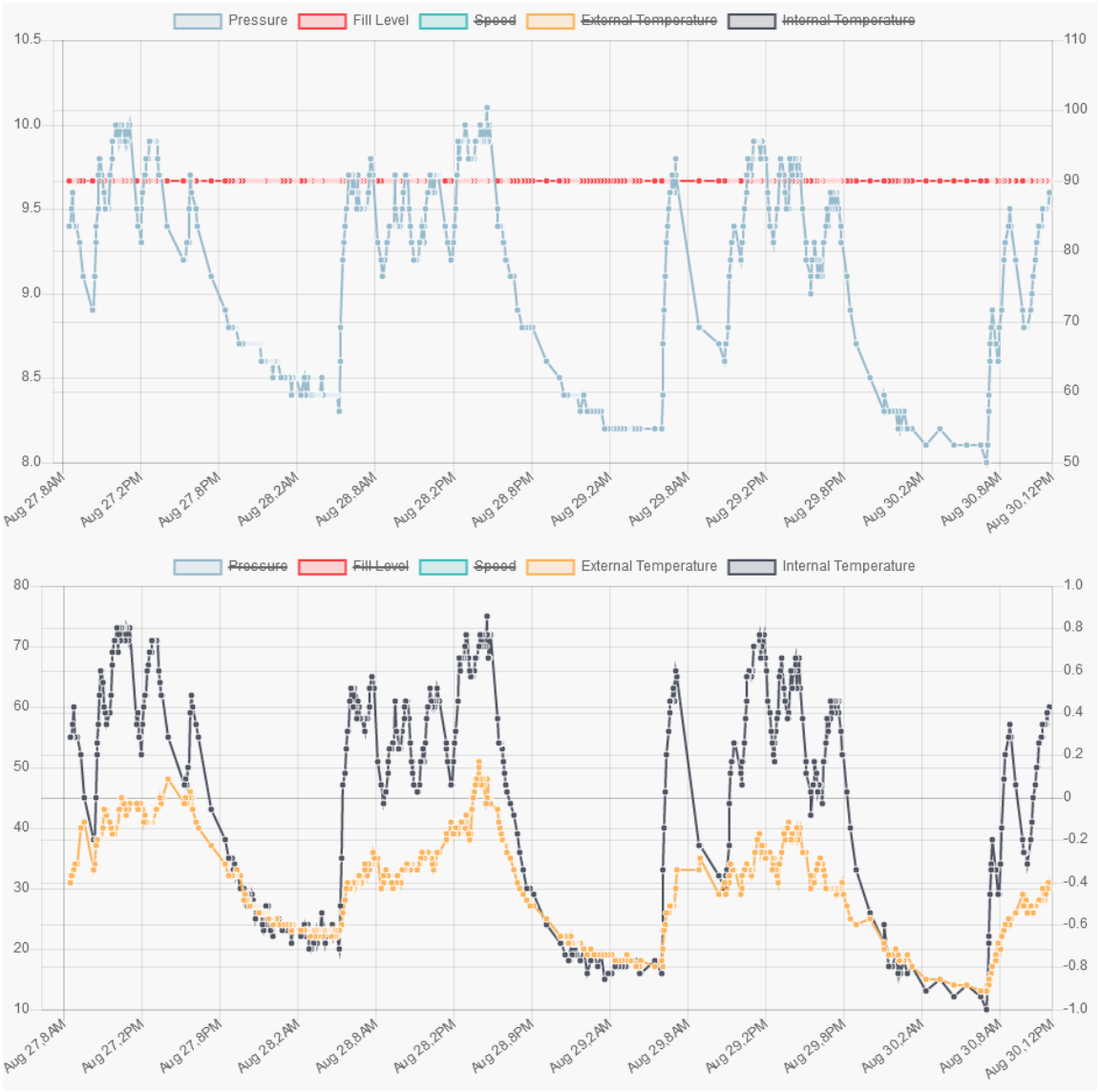


**Figure 10 tyre measurements**

On the measurement tab, 2 graphs are shown. This enable the user to compare the different parameters. Figure 11 shows for exempla a rapidly deflating tyre.

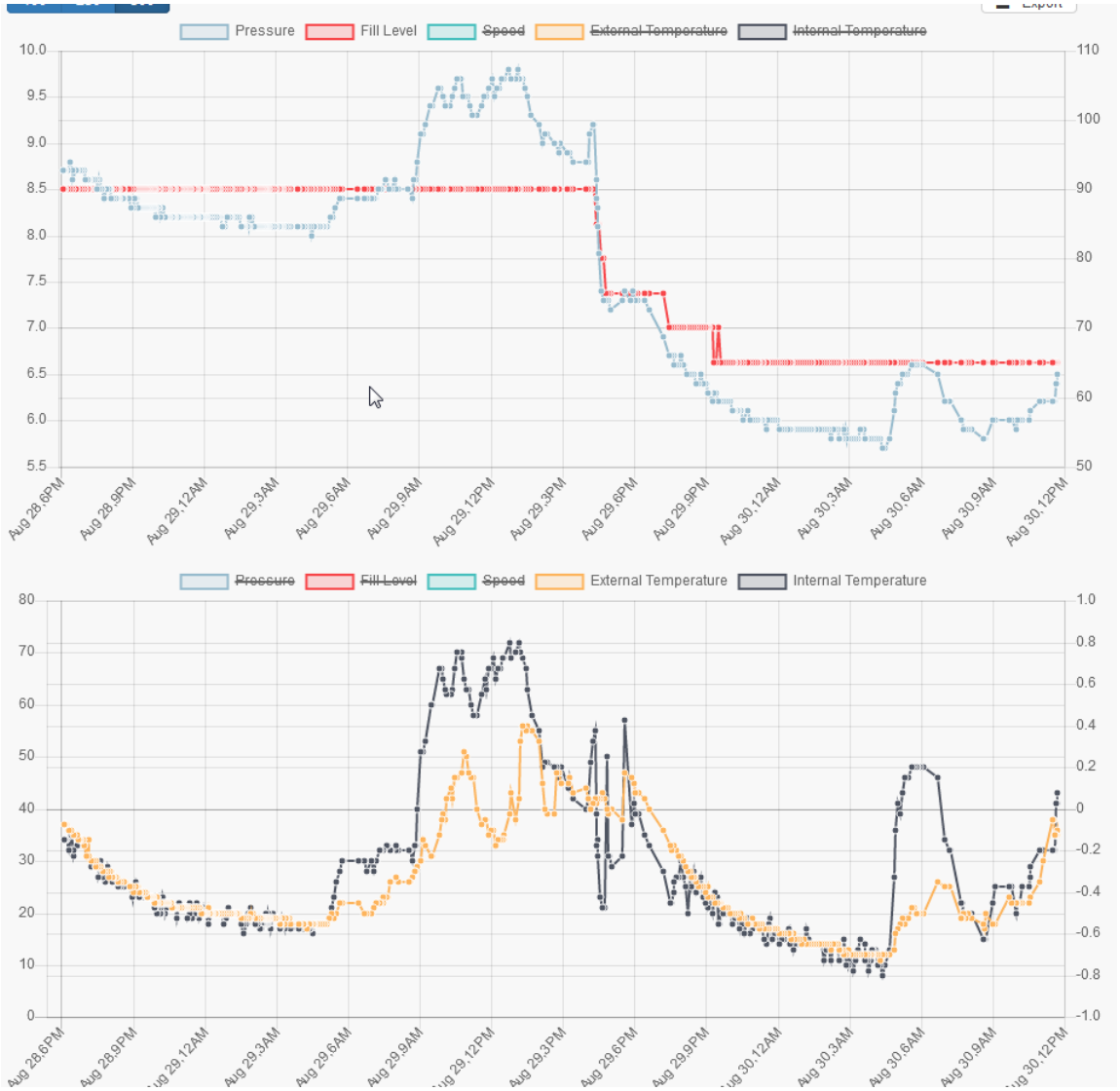


Figure 11 rapidly deflating tyre

# 5. SETUP

## 5.1. PRINCIPLES

The system tries to make the setup as simple as possible, so the settings for a certain tyre come forward in an automated way.

We start with a **vehicle lay-out**. This is the lay-out with the relative position of the tyres on the axes on the vehicle.

Based on the vehicle lay-out, a **vehicle type** is created. A vehicle type is based on the vehicle lay out but defines for all tyres or for individual tyres in the lay-out, the name of the position, the optimal pressure at 15°C and the active alarm levels and alarm repetitions (see 6).

This is the important setup moment. Here the working of the system is defined.

Remark that there can be different vehicle types with the same vehicle lay-out but where the optimal pressures or the alarm repetitions or levels are different for operational reasons.

Vehicles are created in a very easy way and get their setting from the vehicle type chosen.

Tyres are created and allocated on a position of a vehicle. From the vehicle and the vehicle type, the tyres get their settings.

In this way, only the correct vehicles types need a setup and all settings are transferred automatically.

## 5.2. SETUP OF VEHICLE TYPE

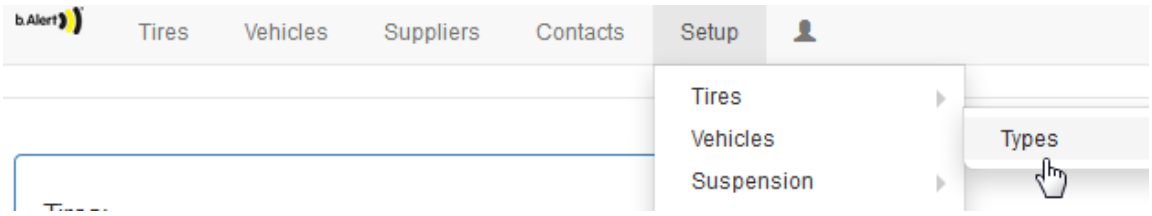


Figure 12 setup vehicle type

Through the menu of Figure 12 it is possible to make a new vehicle type or to adapt the existing types.

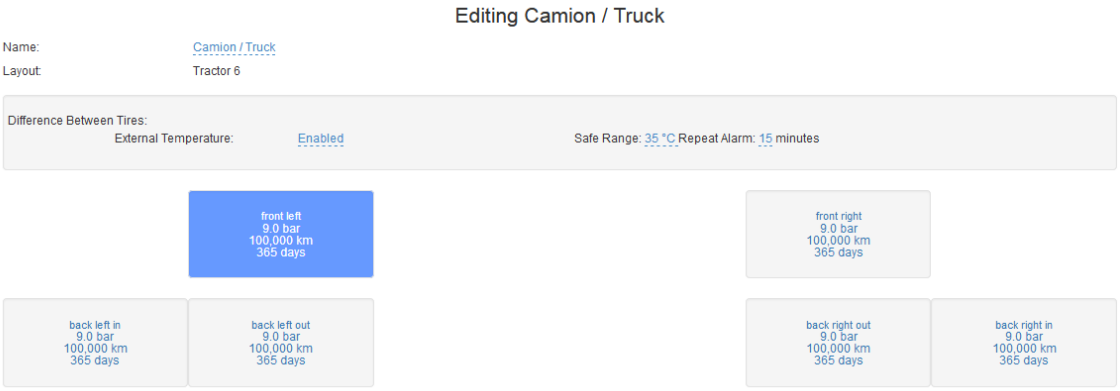


**Figure 13 vehicle type setup general parameters**

The name of the vehicle is defined and the criterion for the comparison of the external temperatures on the tyres. This can be enabled or not, the minimum temperature difference can be set and the frequency at which these alarms are set.

When creating a vehicle type, the lay-out can be chose out of a menu.

When clicking on a tyre position, the settings for this tyre can be set.

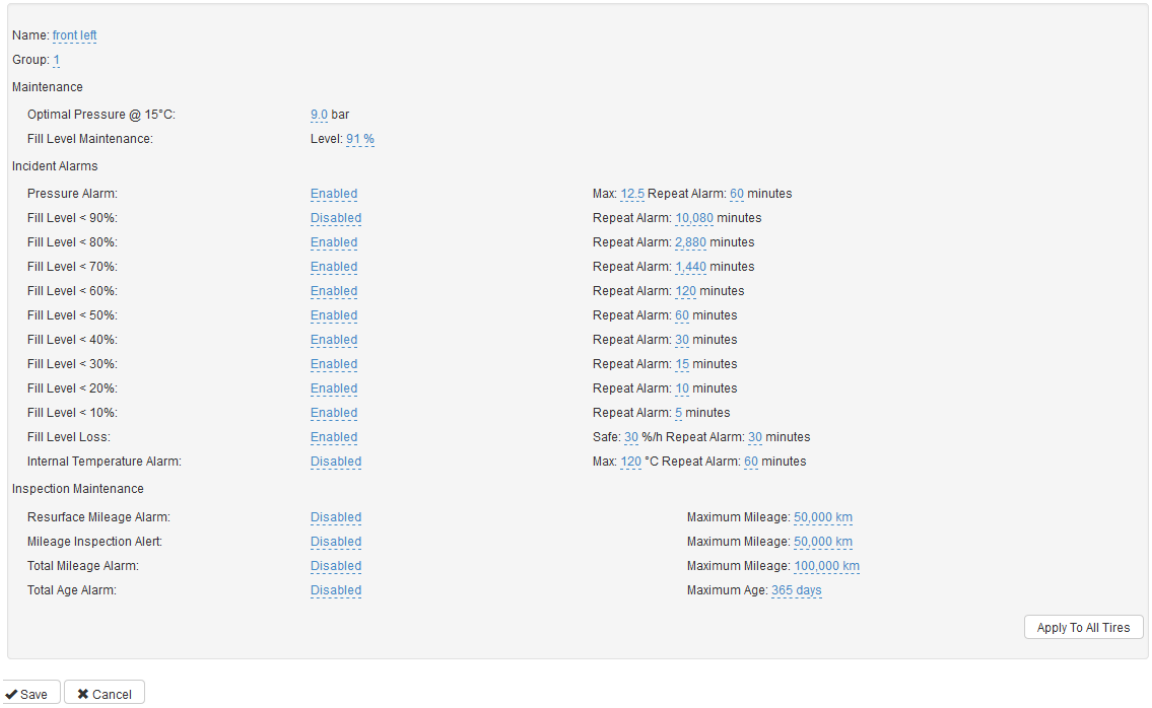


**Figure 14 tyre settings in vehicle type**

The most important parameter is the optimal pressure at the reference temperature of 15 °C as defined in 3.2.

The 1st level that must be defined is the level at which inflation is needed. This is the criterion to put a tyre on a task list as defined in 7.1. This is not an alarm level. No alarms will be sent, only, when you expect the task lists to be produced, this tyre will be on it.

All other levels are alarms. They will be generated the moment they start happing unit they do not exist anymore. These alarms are not cumulative. So, for instance, when the fill level is below 60%, the alarms of 70% and 80% and 90% will not be active.

For every tyre the alarms as defined in 6.1 and 6.2 can be set. Every alarm can be activated or deactivated and the repetition time in minutes must be filled in.

The settings need to be created tyre per tyre. When all tyres have the same settings, they can be copied with “apply to all tyres”.

Do not forget to push the “save” button before leaving the page.

## 5.3. CREATE A VEHICLE

A vehicle can be created on the overview of vehicles.

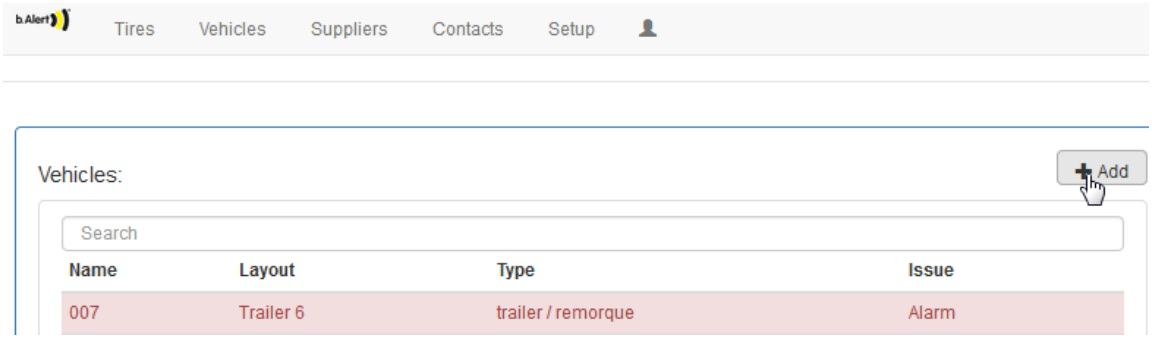


Figure 15 create a vehicle

In the menu the name, the b.Alert unit on the vehicle, if present, and the type of vehicle need to be chosen.

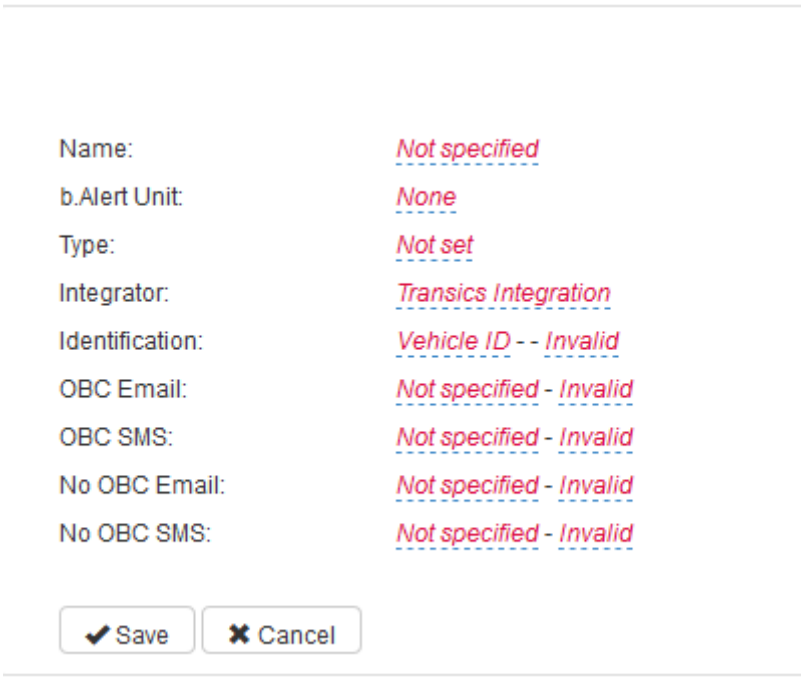


Figure 16 vehicle setup

## 5.4. CREATE A TYRE

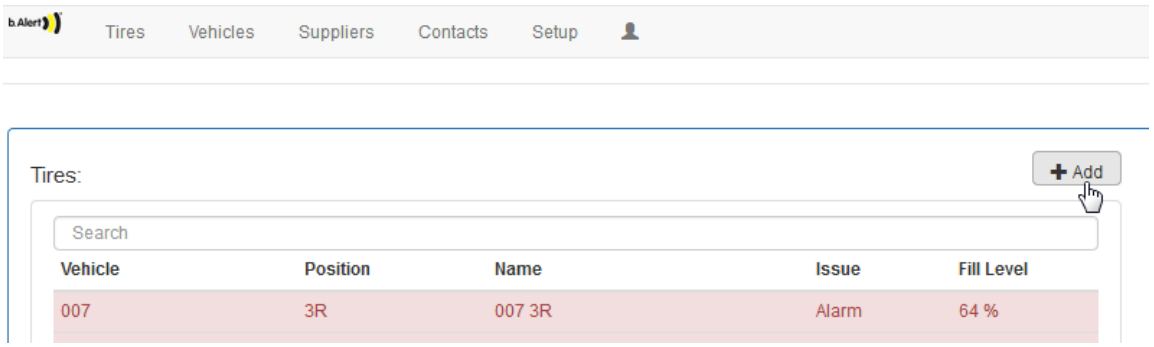


Figure 17 create a tyre

A tyre is created on the overview of tyres as shown on Figure 17.

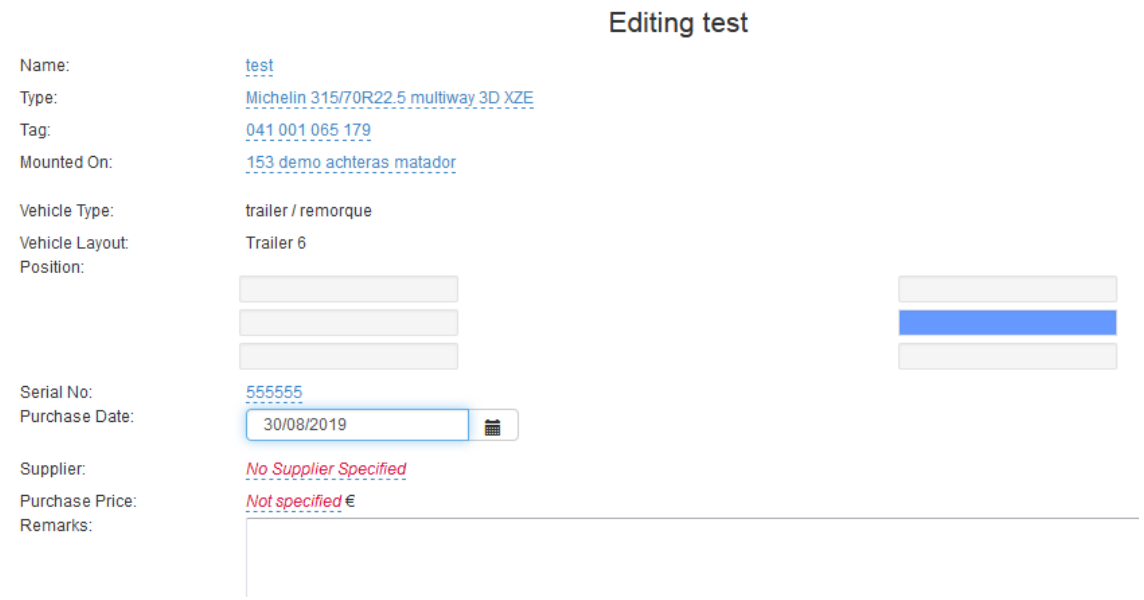


**Figure 18 tyre settings**

The tyre needs name, the type is optional. The tag is chosen from a list of tyre sensors that are still free and not used.

Once the vehicle is chosen, the position on the vehicle can be defined based on the scheme.

# 6. NOTIFICATIONS (ALARMS)

## 6.1. TYPE OF ALARMS

Alarms are given when a measured value on a tyre is coming below or above a certain setup value.

These are the alarms we are using

- The fill level of a tyre is below a certain percentage. There is possible alarm for all percentages
- The fill level drop rate is too high
- The pressure in a tyre exceeds a limit
- The internal temperature in a tyre exceeds a limit
- The difference of the external temperature between different tyres becomes too high. This is a strong indication of an external source of heath at the wheel, probably due to friction, which indicates a mechanical problem

## 6.2. REPETITION OF ALARMS

Some alarms are more serious than others. When the fill level drops a dramatic seed, when the fill level is very low, when the pressure is extremely high, … and the vehicle drives, immediate action is needed. When nothing happens, it is necessary to repeat the alert at a high rate.

However, when a tyre that starts to be a lit underinflated, a warning is needed, but the repetition rate can be very low. This principle can be managed in detail.

How to setup this is defined in 5.2.

## 6.3. SETUP NOTIFICATIONS

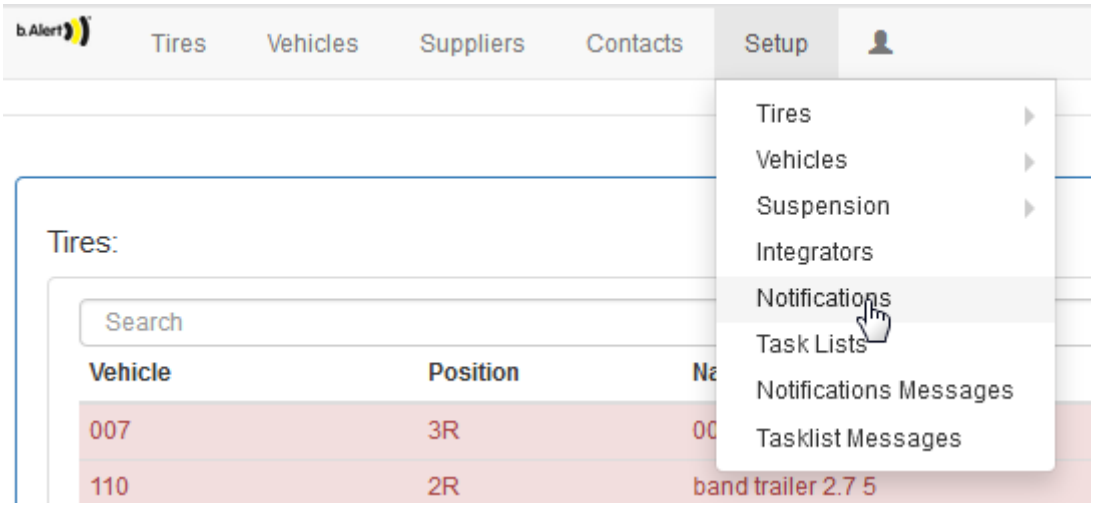


Figure 19 setup notifications

## 6.4. SETUP NOTIFICATION RECIPIENTS

The notifications are created with the creation of rules.

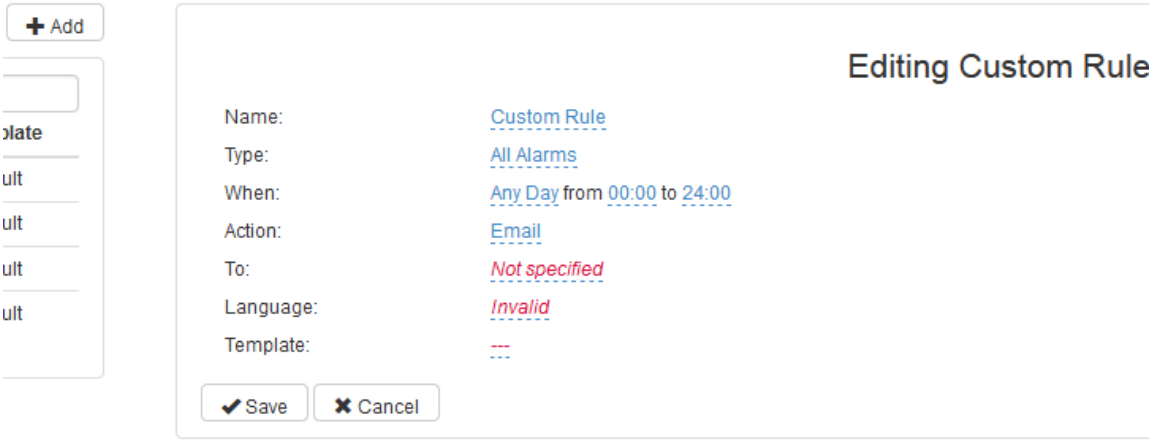


Figure 20 creation of a rule

The type of alarms that is notified can be chosen according to Figure 21. An interesting one is the alarm below a given fill level. This can for instance be used to send only the very important alarms to the driver, while all alarms are sent to the office or workshop.

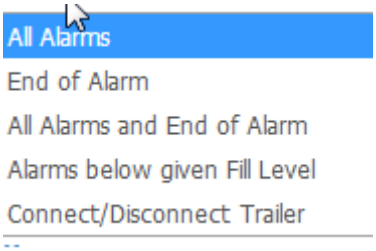


Figure 21 types of alarms

The individual rules can be activated in function of the time

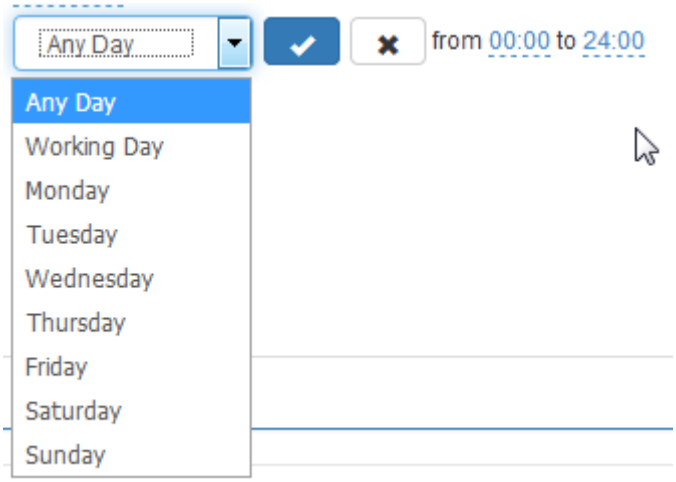


Figure 22 alarm time activation

These notifications are sent to the customer with different through different paths.

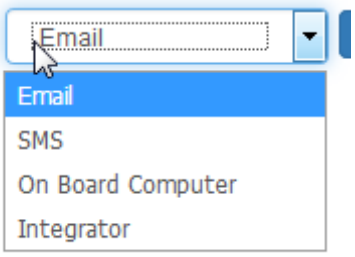


Figure 23 notification paths

For the onboard computers we need an extra setup, but the messages arrive then with the driver on his onboard computer screen as a text message.

With integrator we also need an extra setup. This makes an integration with other software, for instance workshop management software possible.

For every rule the language of the message and the template can be chosen, when extra templates are defined.

## 6.5. SETUP NOTIFICATION MESSAGES

Under notification messages the templates for the different languages are defined. New templates with specific messages can be created. Take care with the format of the variables. The message for SMS is normally smaller and more limited than the standard message.

# 7. TASK LISTS

## 7.1. PRINCIPLE

Task lists are list with tyres that need inflation. This is not an urgent matter, but it needs to be done as soon as possible.

Therefore, the principle is that a task list, with the tyres that need inflation, is sent when somebody can perform the inflation.

There are 2 main criteria: time and place. These lists can be produced a fixed moment or when a vehicle is or arrives at a certain location; or a combination.

The lists consist of all tyres that need inflation, only those in a certain location or only 1 vehicle.

These lists can be combined, so different people get a different message at the same moment (for instance the drive get the message to go to the workshop and a technician in the workshop gets the message to inflate tyre x to a certain pressure).

In this way there is a large flexibility in supporting the optimal process to make sure all tyres are inflated at an optimal fill level, with a minimal effort.

## 7.2. SETUP TAKS LIST RECIPIENTS AND METHOD

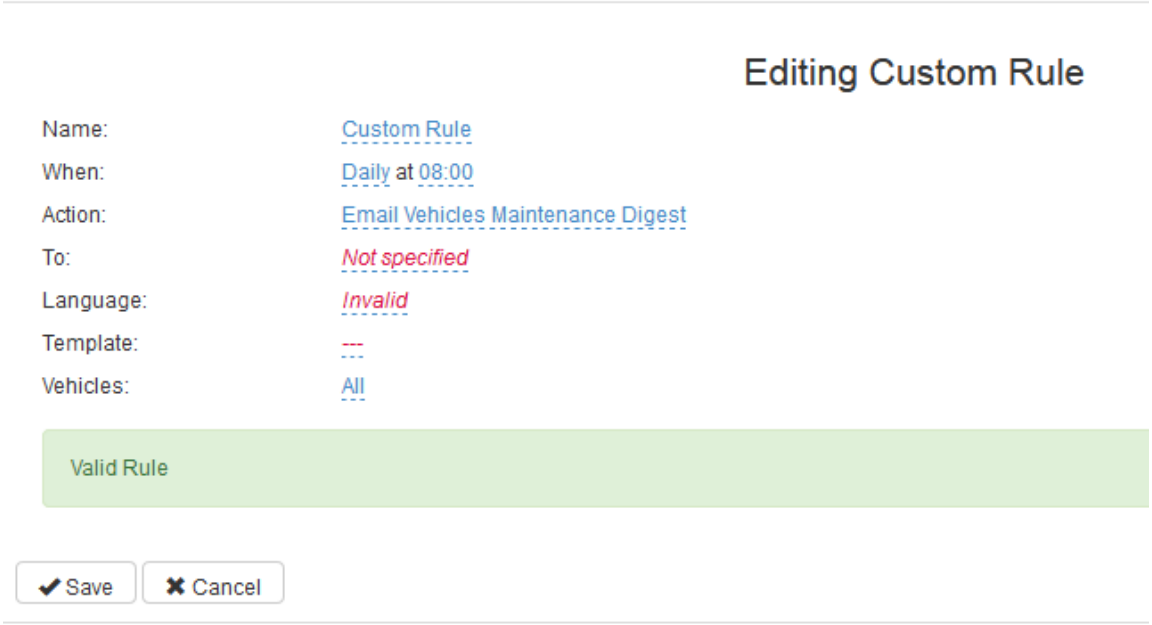


Figure 24 task list creation

The task lists can be sent at different moments

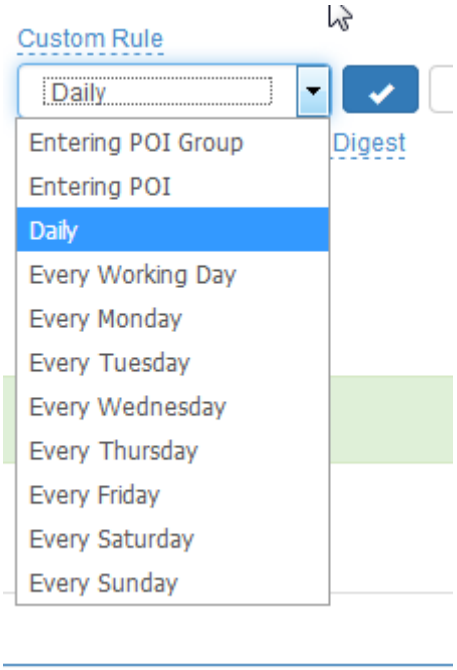


Figure 25 transmission time task list

It happens in function of the day and the time or when the vehicle enters a point of interest. Points of interest (POI) must be created together with a b.Alert administrator and are specific locations defined by the client.

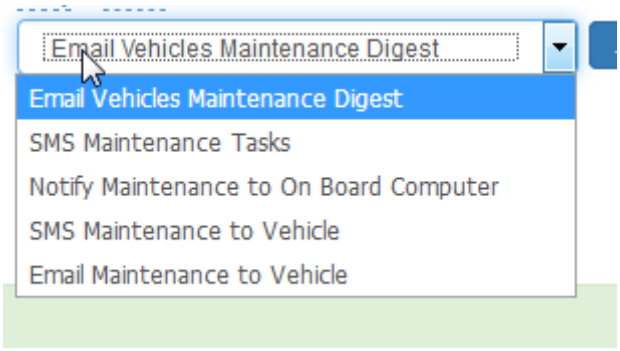


Figure 26 task list actions

Different actions are possible with the maintenance tasks. It is always 1 vehicle except for the digest.

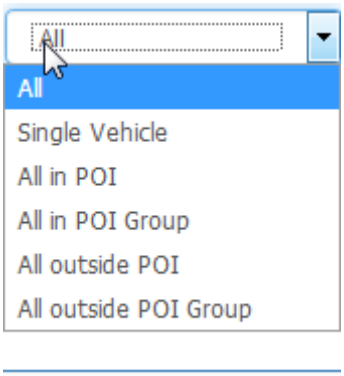


Figure 27 task list vehicles

The last setup defines which vehicles can be on the list. The most logical criterion is al vehicles in a POI or outside a POI.

The SMS number, email address, … also need to be given and the chose template and language.

## 7.3. SETUP TASK LIST MESSAGES

Under task list messages the templates for the different languages are defined. New templates with specific messages can be created. Take care with the format of the variables. The message for SMS is normally smaller and more limited than the standard message.

# 8. HARDWARE AND INSTALLATION

## 8.1. INSTALLATION OF THE UNIT


Figure 28 TPMS unit with sensors

The external antenna needs to be placed on the chassis of the truck or trailer where the unit is mounted. It needs to hang in the middle of the vehicle, freely under the chassis. We define this as “a dogs view”, where the antenna can “see” all tyres and their sensors in an open field under the vehicles.

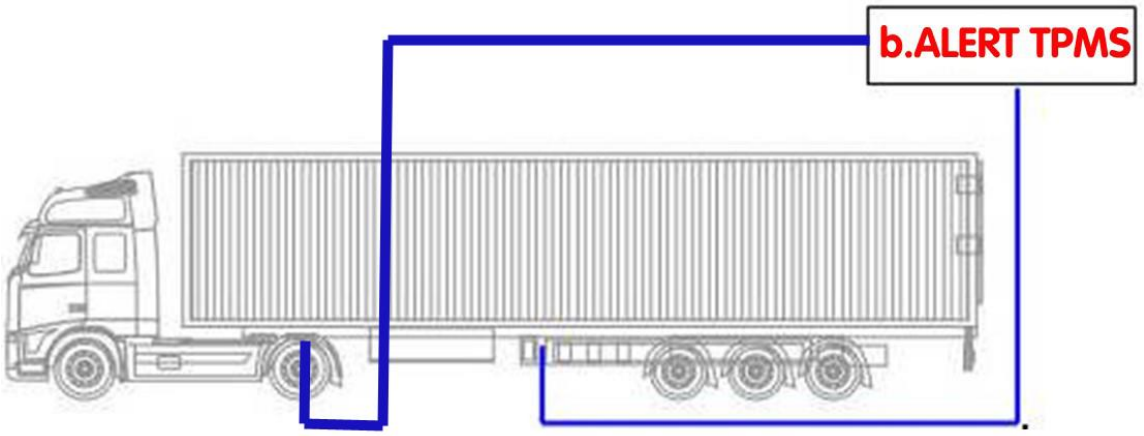


Figure 29 TPMS optimal position

An optimal position of the b.Alert TPMS unit on a trailer is on the inside of the chassis positioned as shown on the figure.

## 8.2. ELECTRICAL CONNECTIONS

The electrical power connection is done with the wire. The red wire is connected to the positive power and the black to the negative or the mass. The connection needs to be powered as long as the trailer is connected to the tractor, also when the engine of the tractor is not running. The specification is 12 or 24 V DC.

With a fully charged internal battery, the unit consumes a maximum of 70 mA. the maximum current consumption with an empty internal battery at 24V is 150 mA.

If wanted, the unit is foreseen with a local alarm to a LED or whatever through an opto-relay.

- **WARNINGS**
    - **Do not connect heavy loads directly, respect the max current limit: Recommended automotive setup : use the OptoMos relay output to control an appropriate automotive relay coil.**
    - **Do not connect GND to one pin and VCC to the other pin of the output : the moment the relay closes you have short circuit.**

## 8.3. INSTALLATION OF THE SENSORS

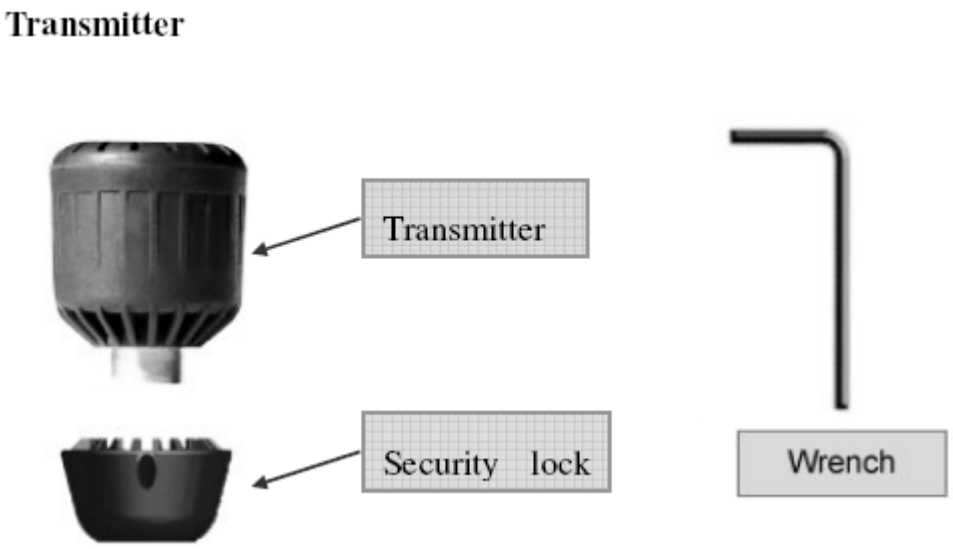


Figure 30 TPMS sensor

Before install the transmitter, make sure the transmitter has been programmed into the unit. When the transmitter is screwed onto the valve according to the programmed position, the receiver can receive the signals.

Figure 31 position of tyre sensor

The sensors are screwed on the valves of the wheels as is shown on Figure 31**Error! Reference source not found.**. Check the connection of Transmitter and valve with the soap solution to confirm whether the transmitter is firmly screwed onto the valve or not, check whether there is air leakage caused by the installation or the seal of the Transmitters or not. The sensor need to stick out of the wheel and cannot be within the metal structure of the wheel.

Each transmitter has a lock to prevent it becomes loose or falls off. Install the lock or not will not influence the functions of the Transmitter. Each transmitter has a security lock and wrench to prevent it becoming loose or falling off. First connect the meshing parts of the Lock and the Transmitter to make them an integrated part, and then screw the Transmitter together with the Lock firmly onto the valve, as shown in Figure 30. Use the provided wrench to fasten the three bolts inside the sockets on the Lock to make sure the Transmitter together with the Lock firmly onto the valve. Then the Transmitter cannot be screwed off unless the three bolts are screwed off by using the wrench.

## 9. USE OF BATTERIES

For the b.Alert units with a rechargeable battery, it is advised that the battery is always kept fully charged.

The unit has an internal trickle charging circuit to charge.

**Never leave a unit with an uncharged battery for more than 2 weeks. If this happens, the capacity of the battery (hence the autonomy) can be reduced.**

To keep the internal batteries always charged at full capacity, a charging time of 12 hours/week is needed. If this is not possible, please contact b.Alert for a solution.

## 10. FIGURES AND TABLES

## COPYRIGHT NOTICE



## PRELIMINARY NOTICE

Kassandra NV aims to deliver hard- software of high quality which conforms to the specifications agreed with licensees, but cannot guarantee that all features will perform exactly as described. Those who use the program do so on the understanding that the results from analysis software are dependent on the inputs and on the quality of the communication networks where the hardware is used. Kassandra NV has no influence on the quality of the network communication and cannot be responsible for the consequences of the network quality. In any case, the program should be used in accordance with the instructions contained in this documentation and other information provided with the program or otherwise supplied by Kassandra NV. Kassandra NV does not warrant that any specific feature will produce specific results, and does not accept liability for any losses, direct, consequential or otherwise, resulting from the use of the hard- or software.

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## REGULATIONS

All hardware complies with CE, EMC and low voltage directives of the EU. It needs to be correctly installed on a compatible host system.

The modules have been assessed in order to satisfy the essential requirements of the R&TTE Directive 1999/05/EC (Radio Equipment & Telecommunications Terminal Equipments) to demonstrate the conformity against the harmonized standards with the final involvement of a Notified Body.

The modules are in compliance with the essential requirements and other relevant provisions of the directives 2006/95/EC (LVD), 2011/65/EU (RoHS) and 2004/104/EC (EMC).

## BATTERY DISPOSAL

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

## HIGH RISK MATERIALS

Components, units, or third-party products used in the product described herein are NOT fault-tolerant and are NOT designed, manufactured, or intended for use as on-line control equipment in the following non limited list of hazardous environments requiring fail-safe controls: the operation of Nuclear Facilities, Aircraft Navigation or Aircraft Communication Systems, Air Traffic Control, Life Support, or Weapons Systems (High Risk Activities"). B.Alert and its supplier(s) specifically disclaim any expressed or implied warranty of fitness for such High Risk Activities.

## ENVIRONMENTAL INFORMATION FOR CUSTOMERS IN THE EUROPEAN UNION

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

Recupel membership 491611.

# LIMITED PRODUCT WARRANTY

## GENERAL TERMS

This Limited Product Warranty applies to B.ALERT branded products (collectively referred to as "B.ALERT Products") sold by Kassandra NV., its European subsidiaries, affiliates, authorized resellers, or country distributors (collectively referred to as "B.ALERT Resellers") with this Limited Product Warranty. The term "B.ALERT Product" is limited to the hardware components and all its internal components including firmware and the balert.net platform. The term "B.ALERT Product" DOES NOT include any other software applications or programs. This Limited Product Warranty is only effective upon presentation of the proof of purchase. Upon further request by B.ALERT, this warranty card has to be presented, too.

Except as expressly set forth in this limited warranty, b.Alert makes no other warranties, express or implied, including any implied warranties of merchantability and fitness for a particular purpose. B.Alert expressly disclaims all warranties not stated in this limited warranty any implied warranties that may be imposed by law are limited in duration to the limited warranty period.

To the extent allowed by local law, the remedies in this warranty statement are client's sole and exclusive remedies against b.Alert. In no event will b.Alert be liable for loss of data or for indirect, special, incidental, consequential (including lost profit or data), or other damage, whether based in contract, tort, or otherwise.

## COUNTRIES IN WHICH THIS B.ALERT LIMITED PRODUCT WARRANTY APPLIES

This Limited Product Warranty is applicable to Hardware Products sold by B.Alert Resellers in all countries listed under the heading "Countries in which this B.ALERT Limited Product Warranty applies". The Limited Product Warranty will be honored in any country where B.ALERT or its authorized service providers offer warranty service subject to the terms and conditions set forth in this Limited Product Warranty. However, warranty service availability and response times may vary from country to country and may also be subject to registration requirements.

## LIMITATION OF PRODUCT WARRANTY

B.ALERT warrants that the products described below under normal use are free from material defects in materials and workmanship during the Limited Product Warranty Period set forth below ("Limited Product Warranty Period"), if the product is used and serviced in accordance with the user manual and other documentation provided to the purchaser at the time of purchase (or as amended from time to time).

B.ALERT does not warrant that the products will operate uninterrupted or error-free or that all deficiencies, errors, defects or non-conformities will be corrected.

This warranty shall not apply to problems resulting from: (a) unauthorized alterations or attachments; (b) negligence, abuse or misuse, including failure to operate the product in accordance with specifications or interface requirements; (c) improper handling; (d) failure of goods or services not obtained from B.ALERT or not subject to a then-effective B.ALERT warranty or maintenance agreement, (e) improper use or storage, (f) opening or removing Covers or (g) fire, water, acts of God or other catastrophic events. This

warranty shall also not apply to any particular product where the B.ALERT serial number has been removed or defaced in any way b.Alert is not responsible for damage that occurs as a result of your failure to follow the instructions for b.Alert

## LIMITED PRODUCT WARRANTY PERIOD

The Limited Product Warranty Period starts on the date of purchase from B.ALERT. Your dated sales or delivery receipt, showing the date of purchase of the product, is your proof of the purchase date. You may be required to provide proof of purchase as a condition of receiving warranty service. You are entitled to warranty service according to the terms and conditions of this document if a repair to your B.ALERT branded hardware is required within the Limited Product Warranty Period.

This Limited Product Warranty extends only to the original end user purchaser of this B.ALERT Product and is not transferable to anyone who obtains ownership of the B.ALERT Hardware Product from the original end-user purchaser.

Warranty Period: Two (2) years.

## LIMITED PRODUCT WARRANTY PERIOD

If a product defect occurs, B.ALERT 's sole obligation shall be to repair or replace any defective B.Alert Product free of charge provided it is returned to an Authorized B.ALERT Service Centre during the Limited Warranty Period. Such repair or replacement will be rendered by B.ALERT at an Authorized B.ALERT Service Centre. All component parts or hardware products that are replaced under this Limited Product Warranty become the property of B.ALERT. The replacement part or product takes on the remaining Limited Warranty Period of the replaced part or product. The replacement product need not be new or of an identical make, model or part; B.ALERT may in its discretion replace the defective product (or any part thereof) with any reconditioned equivalent (or superior) product in all material respects to the defective product.

## WARRANTOR

Kassandra NV.

Telephone +32 (0)50 47 20 23

Spanjaardstraat 4

8000 Brugge

Belgium

## SAFETY INSTRUCTIONS

Please adhere to the following safety guidelines to help ensure your own personal safety and protect your system from potential damage. Any acts taken that are inconsistent with ordinary use of the product, including improper testing, etc, and those not expressly approved by B.Alert may result in the loss of product warranty.

Unless expressly approved by an authorized representative of B.Alert in writing, you may not and may not permit others to,

- Disassemble or reverse engineer the device or attempt to derive source code (underlying ideas, algorithms, or structure) from the device or from any other information provided by b.Alert. except to the extent that this restriction is expressly prohibited by local law.
- Modify or alter the device.
- Remove from the device any product identification or other notices, including copyright notices and patent markings, if any.

To reduce the risk of bodily injury, electrical shock, fire, and damage to the device and other equipment, observe the following precautions:

## POWER SOURCES

- Observe and follow service markings.
- Do not push any objects into the openings of your device unless consistent with the authorized operation of the device. Doing so can cause a fire or an electrical shock by shorting out interior components.
- The powering of this device must adhere to the power specifications indicated for this product.
- Do not overload extension cords as this will increase the risk of fire or electrical shock.
- Do not rest anything on the power cord or on the device (unless the device is made and expressly approved as suitable for stacking).
- Position system cables and power cables carefully; route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables
- Operate the device only from the type of external power source indicated on the electrical ratings label.
- Use only approved power cable(s). If you have not been provided a power cable for your device or for any AC-powered option intended for your device, purchase a power cable that is approved for use in your country and is suitable for use with your device. The power cable must be rated for the device and for the voltage and current marked on the device's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the device.
- When connecting or disconnecting power to pluggable power supplies, if offered with your device, observe the following guidelines
    - Install the power supply before connecting the power cable to the power supply.

- Unplug the power Cable before removing the power supply,
- If the system has multiple sources of power, disconnect power from the device by unplugging all power cables from the power supplies.

## BATTERY

This product uses a LiPo battery. Please charge the battery fully before first use. Refer to operational temperature ranges in the specification appendix. Operation in low (below -20°C) or high (over 45°C) temperatures will affect power supply efficiency and the ability to charge the battery. All Lithium-Ion batteries will experience power supply efficiency deterioration over time, even if not used, and have a limited life expectancy. Do not pierce, open or disassemble the battery Do not swallow the battery. If the battery leaks and you come into contact with the leaked fluids, rinse thoroughly with water and seek medical attention immediately.

Do not put, store or leave your product in or near a heat source; in a high temperature location; in strong direct sunlight; in a microwave oven; in a pressurized container, and do not expose it to temperatures over 80°C. Failure to follow these guidelines may cause the Lithium-Ion battery to leak acid; become hot explode; or ignite and cause injury and/or damage.

The lithium-ion battery contained in the product must be recycled or disposed of properly. Use only with supplied charger(s) and supplied ac adaptor for battery charging.

## SERVICING AND DISASSEMBLING

- Do not service any product except as expressly set forth in your system documentation.
- Opening or removing Covers that are marked with the triangular symbol with a lightning bolt may expose you to an electrical shock. Only a trained service technician should service components inside these compartments.
- To reduce the risk of electrical shock, never disassemble this device. None of its internal parts are user-replaceable; therefore, there is no reason to access the interior.
- Do not spill food or liquids on your system components, and never operate the device in a wet environment. If the device gets wet, see the appropriate section in your troubleshooting guide or contact your trained service provider.
- Use the device only with approved equipment

## ENVIRONMENT

- Do not emerge the product under water
- Keep your device away from radiators and heat sources. Also, do not block cooling vents.

## CLEANING

- Do not use liquid or aerosol cleaners of any kind. Use only compressed air that is recommended for electronic devices.