

# TermoSense® control system

Control and monitoring system for heat maintenance and positioning of depot-deployed buses

Ver 1.04, 2019-03-12

The products and the coherent system of collaborative IoT products are called TermoSense®, which are manufactured and supplied patent-protected by SensiNet AB. SensiNet AB provides the system with support and the web portal TSI.

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- Principle sketch for bus connection to ramp
- Questions and answers (FAQ)

We reserve the right to make technical changes  
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# TermoSense® system overview

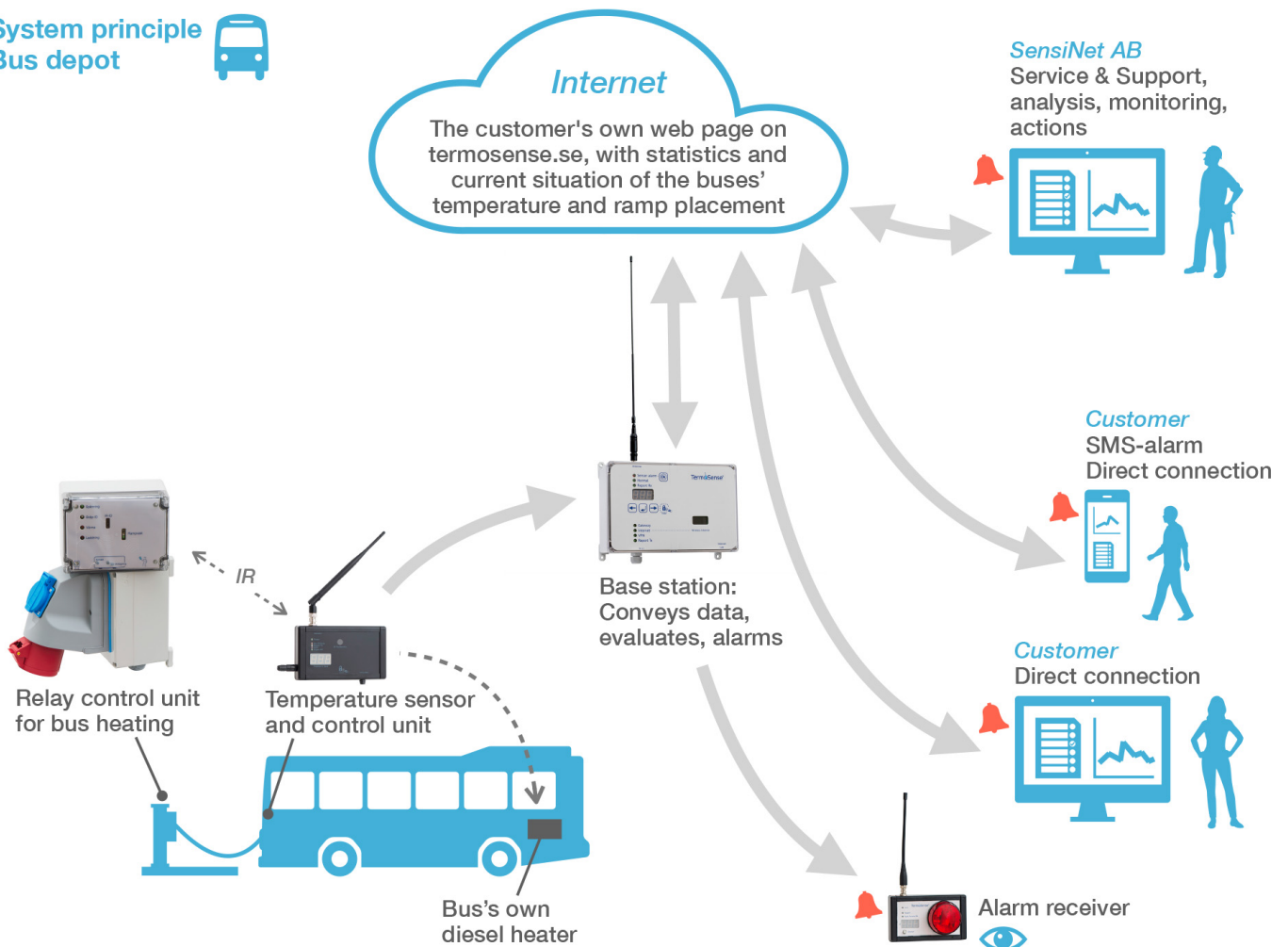
## Energy

TermoSense® control system installed to supplement existing systems and is aimed to control the power consumption when the buses heat maintenance is optimised for precise temperature and energy consumption.

## Logistics

The system wirelessly informs where the bus is parked, which helps chauffeurs and depot staff to find the current bus. The system can include several different depots with free disposition of buses between the depots. Departure of the buses is automatically recorded. Access to the database server via the Internet.

### System principle Bus depot



# Ramp unit

RampRxIR

## Function

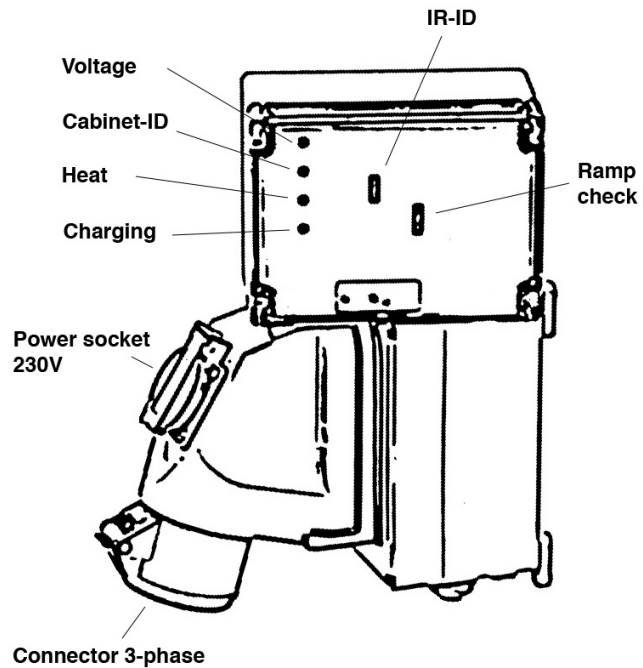
Fixed ramp unit with relay control of bus heating.

Communicates with temperature control unit in bus (*TempCTL*) via IR.

## Installation

Variants of bus depots:

- District heating supplied depot / ramp cabinet. The RxIR ramp is connected and operate in the cabinet.
- Fully electricity driven depot. Electric charging is connected.
- Fully electricity driven depot with timer system. Timer system disconnected.
- Diesel.
- Diesel + electricity.



Steps:

1. Placement: Make sure that the location of the ramp unit RampRxIR is correct. Appropriate location may differ depending on bus types and where their TempCTL is mounted, both in width and height. See appendix principle sketch for bus connection to ramp.
2. Connection, depending on variant:
  - District heating: RampRxIR controls the circulation pump in the ramp cabinet. Disconnect the circulation pump connector and connect the RampRxIR via adapter cables.
  - Direct electricity: Connect the RampRxIR between the power supply and the bus. The result is that RampRxIR dispenses three-phase electricity to the bus as needed.
  - Diesel: The diesel heater within the bus is connected and controlled by TempCTL. (RampRxIR is then used for positioning the bus.)
3. Marking: The ramp unit RampRxIR is marked with a serial number, or with letter + serial number according to the ramp position.
4. To consider:

If the RampRxIR is not mounted under a canopy that protects against the weather (sun, wind, snow), it is recommended to have a small "roof" of at least 400\*300 mm in dimension just above. Note, do not turn unnecessarily! When the ramp unit is mounted and the communication unit angle is set correctly, it should not be rotated any more. It is important to inform the staff about this.

## Technical specification

Designed for voltage 400VAC three phase. (Also available model for voltage 230VAC single phase.)

Degree of protection: IP66 / IP67

Size: communication unit 160x120x90 mm, total incl. connection unit 160x300x250 mm

## Parts included

- Ramp unit
- Connection cable

## Required accessories

Mounting plate and precipitation protection.

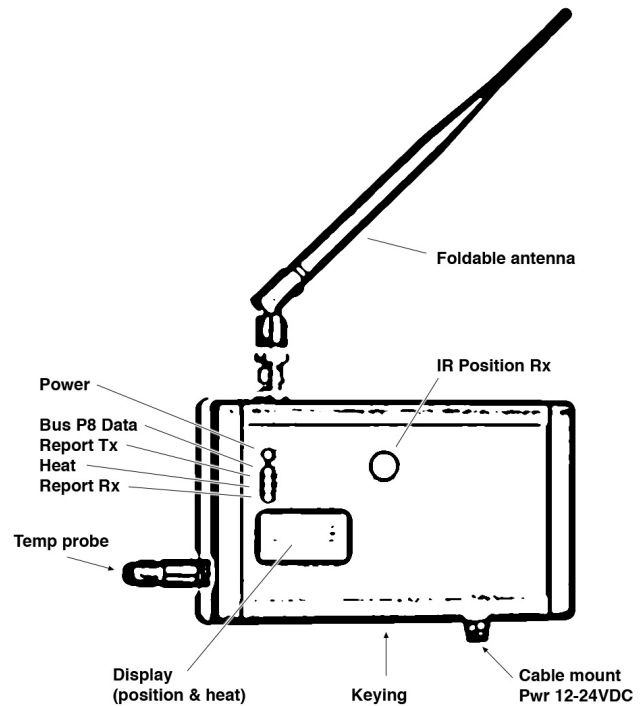
# Temperature control unit in bus

TempCTL

## Function

Vehicle-mounted sensor / control unit for controlling heat maintenance in buses. Communicates with ramp-mounted *RampRxIR* via IR for heating control. Also communicates with *Base station* via radio to denote which ramp it has been contacted with - position determination. The temperature control in buses can also be read from TempCTL using the remote control *Bus Tool*.

(With TempCTL + (plus version), diesel heaters, convector vectors and booster pumps can be controlled locally inside the bus.)



## Installation

Steps:

1. **Activate** the sensor and pair it with the current bus by:  
Note information about the sensor ID (6 digits), the bus ID (usually 4 digits), and the bus registration number. Send the information to [info@sensinet.se](mailto:info@sensinet.se) for software registration in the system.
2. **Mount** the holder, the sensor and antenna in the bus:  
Ensure that the location of TempCTL is correct. Place at the drivers seat with unobstructed view towards ramp unit for communication and control. The location may differ depending on the type of bus, but it is important that it is done consistently and always installed the same in the respective bus type. It is important that all TempCtl are in the same place in the bus if the buses change depots. (There are different types of brackets depending on the location, for example rotatable holder which is screwed onto vinyl in front of the driver.)  
See appendix principle sketch for bus connection to ramp.
3. **Connect the supply voltage:**  
Cable is usually pulled under the vinyl against the B+ pole.  
There are two variants of connection: Regular bus or bus with diesel heater  
As a basis, the black and red wires are always connected at B + pole:
  - **Black** is connected to the ground.
  - **Red** is connected to +24V continuous supply voltage\*.

\*(It is important that the sensor receives a constant voltage from the battery in order to avoid interruptions at start or the like. (It is usually known as B + in the bus.))
4. **If necessary, connect the control of the diesel heater:** (Applies to TempCTL +)  
If you want to control a diesel heater it can be done by connecting brown and orange wire.
  - **Brown** wire : "Common" that one can potentially connect to, decide on "Common ground" or "Common +24".
  - **Orange** wire provides with contact: Ground or +24. The contact functions are "NO = Normally Open". "OFF" = heat off = open contact. "On" = heat on = closed contact.
  - **Green** och **yellow** wires are reserved for functions for TempCTL + in future versions.

The above is completely free from the voltage supply to TempCTL itself (black and red wire). This means that the accuracy of the battery voltage monitoring is not affected by the functions or its connection.

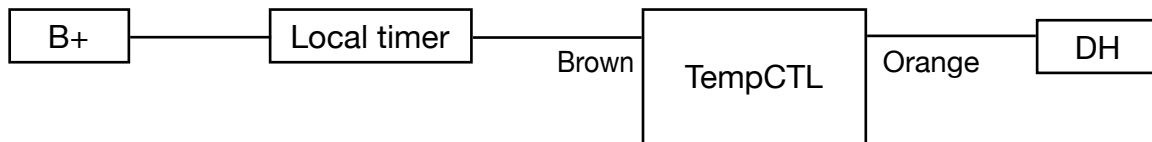
Diesel heaters can be controlled in series or in parallel with existing timer in the bus. The two different modes of connection of diesel heater units have their advantages and disadvantages.

**Serial control** - *The setpoint from TempCTL govern - Both timer and TempCTL the diesel heater to start.*

The local timer in the bus can be set, but has no power to start when the temperature in the bus exceeds the set reference value of TempCTL. The local timer cannot be used when the bus has left the depot and lost contact with the base station.

Connection is done as follows:

- Black is connected to the ground.
- Red connected to B +.
- Diesel heater trigger cable from local timer is cut and connected to the brown cable.
- Orange cable is connected to the part of the cut cable that goes to the diesel heater.

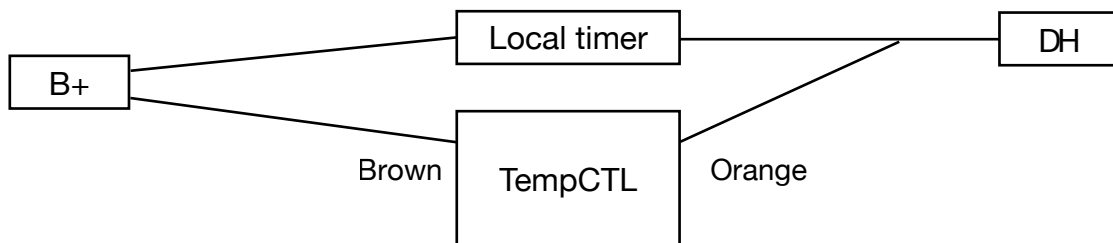


**Parallell control** - *It is enough that either the Timer or TempCTL should want the diesel heater to start.*

The local timer has the power to start the diesel heater even when the temperature exceeds the set point value from TempCTL. The local timer operates normally even when the bus leaves the depot and loses contact with the base station. The savings can be adversely affected by the local timer being used.

Connection is done as follows:

- Black is connected to the ground.
- Red and brown are connected to B+.
- Orange is connected to the diesel heater trigger cable.



5. **Fuse holder** including fuse secured relatively near the far end of the cable, seen from TempCTL. It is recommended to provide the cable ends with end sleeves, as the cables are thin.

### Troubleshooting TempCTL

- Make sure it is firmly mounted.
- Make sure that it faces the ramp unit when the bus is parked.
- Check that it "look" the ramp unit = the rampunit ID is shown in the display.
- If no action helps - send it in for service or replace it with another unit.

### Replacement of TempCTL

- Disconnect the long cable and leave it there (if it does not need to be replaced).
- Release TempCTL from its mount.
- Send the removed sensor to SensiNet AB or SensorIoT Service AB for action.
- About new replacement sensor: Note information about the new sensors ID (6 digits) bus ID (usually 4 digits) and the bus registration number. Send the information to [info@sensinet.se](mailto:info@sensinet.se) for software registration of the exchange in the system.
- Mount the sensor

**Direction of antenna**

The antenna should be aligned as shown in the picture or be straight up, for best contact with the Base Station and the TSI system.

**Technical specification**

Size: 160x94x32 mm

Antenna: BNC

Radio communication: License-free low-level radio, compatible with the industrial wireless control system RadioPLC®.

IR communication: IR communication occurs between TempCTL<>ramp unit and also between TempCTL<>Bus Tool (remote control). The signal is coded and has checksums control.

**Parts included**

- TempCTL
- Tilttable antenna
- Connection cable 7m (Elcuflex FM 6xAWG24)

**Required accessories**

- Bracket / sensor holder
- Fuse holder + fuse (0.2A)

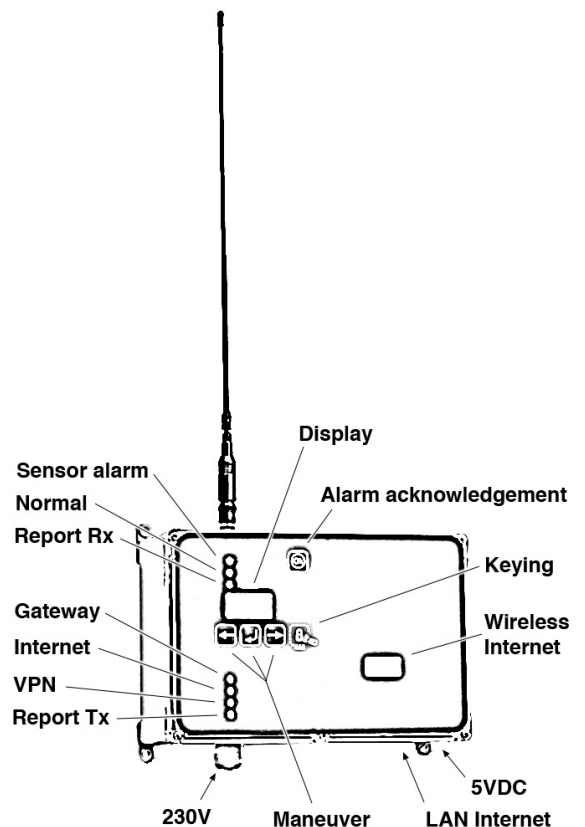
# Base station

## Function

The base station continuously receives measurement values from up to 100 sensors \*, monitors and generates alarms. The values are passed over the Internet to the operational server (TSI), via LAN or built-in router for mobile networks(optional). The base station always contains current measured values and emits local alarms with flashing lights and beeps. The alarms can also be sent as SMS and/or e-mail. The base station also sends alarms to local alarm receivers that can be placed in the expedition or at the alarm central unit. \*(100 sensors for Non-Stop<sup>iot</sup> base station and 60 sensors for previously TemoSense<sup>®</sup> base station (larger typ).

## Installation

Connection to the internet must be made wired to the LAN with cable. If it cannot be arranged, Base station with built-in wireless connection to the internet must be selected (art no. P194).



- Location and antenna: Base station with its antenna should be placed in a protected environment and central to the buses so that every bus can be reached. For small depots supplied antenna is sufficient. For larger depots, there is an outdoor base station antenna (art. No. 911).

The antenna is placed high and free (see section *Outside base stations-antenna*).

- The base station should reach all buses/TempCTL at the depot.
- Max 100 buses. If there are more buses in the depot, two base stations are used that are placed adjacent to each other.
- Outside temperature sensor: Should be found on each depot. It is advisable to insert it as the first unit in the base station so that it receives node number 1. It is important that it is placed so that the sun does not light up on it, eg on the north side of a pump housing under the eaves so that it is also protected from rainfall (see Outside temperature sensor).

## Activate units with keying

Normally, products that are mounted in a plant are keyed (inserted into the base station) already on delivery, but there may be occasions when keying needs to be done on site. This may apply to products such as outdoor temperature sensors, alarm receivers and repeaters.

Keying is done at the base station as follows:

- Make a short keying \* (2 seconds) of the base station: Hold the touch-free activation key against the key symbol and read "Unl", stands for "Unlock" which means that keying of products can be done in about 4 minutes.
- Make long keying \* (10 seconds) of the product: Hold the touch-free activation key against products key area\*\*. After a long keying the product is activated and added to the system base station node tabel.

\*( The product display shows the measured value after 2 sec (short keying). After 5 sec, two values are displayed which represent the sensor ID, after 8 sec the version number (long keying) is shown. When keying for 13 seconds, the sensor is deactivated and confirms this by displaying OFF in the display.)

\*\* ( On smaller units (eg temperature sensor), the keying area is at the bottom right below the text PATENT. On larger products such as alarm receivers and repeaters (b = 160mm h = 94mm), keying area is at the middle of the bottom edge.

**Technical specification**

(Alarm: A- och B-alarm), button for alarm acknowledgment. Buttons for scrolling up/down.

Buttons for scrolling up/down in the node table.

Maneuver: With touch-free activation key to "unlock". Buttons for displaying measured values and adjusting alarm limits.

Indicators: LEDs and display which together provide information about measurements, alarms, communication status, and more.

Size: 240x160x100, weight 1,16 kg, "lugs" for wall mounting.

Degree of protection: IP21

Antenna: BNC, the standard antenna is possible to switch to the amplifying base station antenna.

**Parts included**

- Base station
- Little short BNC-antenna
- connection cabel to 230V
- LAN cabel
- two touch-free activation keys

**Required accessories**

- Base antenna (art no. 911)
- Antenna cabel BNC. Available in lengths 0,5 m, 1 m, 2,5 m, 5 m, 10 m, 15 m and 20 m.



# Outdoor base station antenna

Article number 911

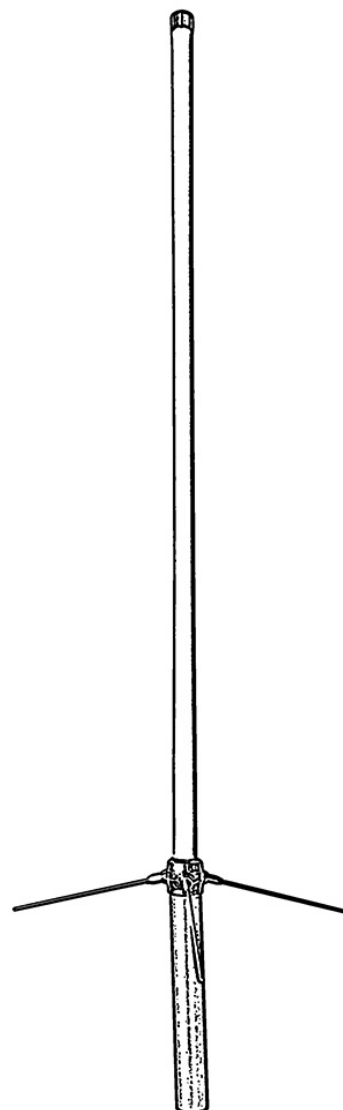
## Function

Base station antenna suitable for larger bus depots, for communication between base station and the buses TempCTL, exit detection units, outdoor temperature sensor, etc.

(This antenna can also be used with a Repeater to increase the signal strength in "difficult" environments or geographically extended depots.)

## Installation

Location: The antenna is placed centrally in relation to the buses, so that all buses can be reached. It is placed high and free so that it is not disturbed by, for example, metal structures or bulky buildings.



# Outside temperature sensor

TempTx

## Function

Measures wirelessly and continuously outside temperature as a complement to the temperature measurement in the buses. TermoSense®-system then has all the information for the best possible temperature regulation of buses.

## Installation

- A temperature sensor must be available on each bus depot.
- Placed in such a way that the sun does not light up on it, e.g. on the north side of a pump housing under the eaves so that it is also protected from precipitation.
- Keying: It is advisable to insert it as the first unit in the base station so that it receives node number 1.

## Technical specification

Measurement value, temp: -30 till 100°C, resolution 0,1°C, accuracy 0,2°C.

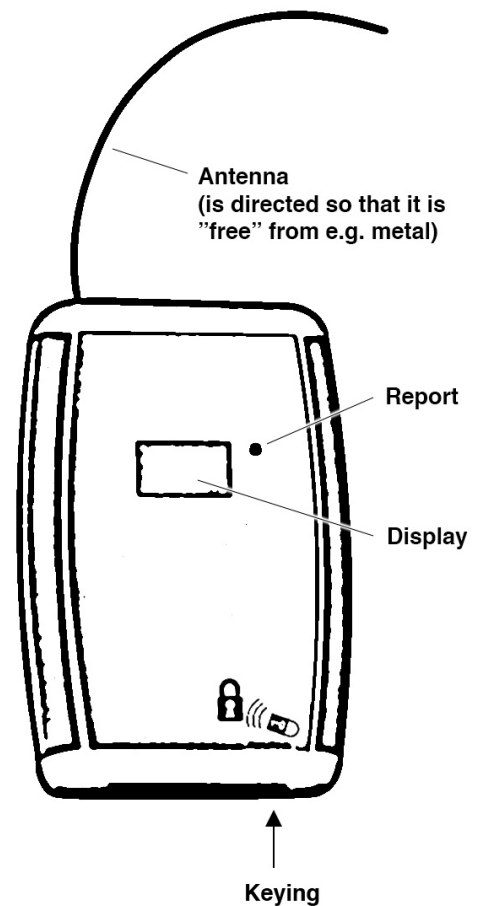
Design: With display for manual reading on site.

Operation: With patented non-contact activation key.

Expected battery life: Up to 17 years. Intelligent battery saving technology - the battery is used only when significant changes occur.

Degree of protection: IP66

Size: 79x117x24 mm



# Exit detection unit

U01

## Function

For acknowledgment at the exit that vehicles leave the depot. Fixed mounted U01 communicates via IR against vehicle-mounted TempCTL. When bus gets in touch via IR, the system knows that a bus is exposed.

## Installation

Placed at the exit from the depot so that all buses leaving the depot pass in front.

## Technical specification

Maximum range: 25m

Designed for voltage 230VAC single phase

Degree of protection: IP66/IP67

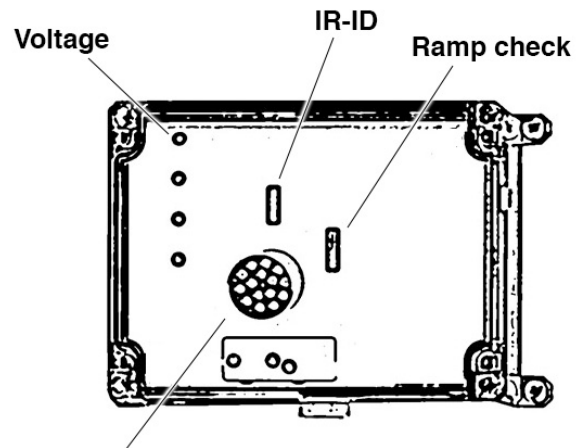
Size: communication unit 160x120x90 mm

## Parts included

Exit detection unit U01 including cable.

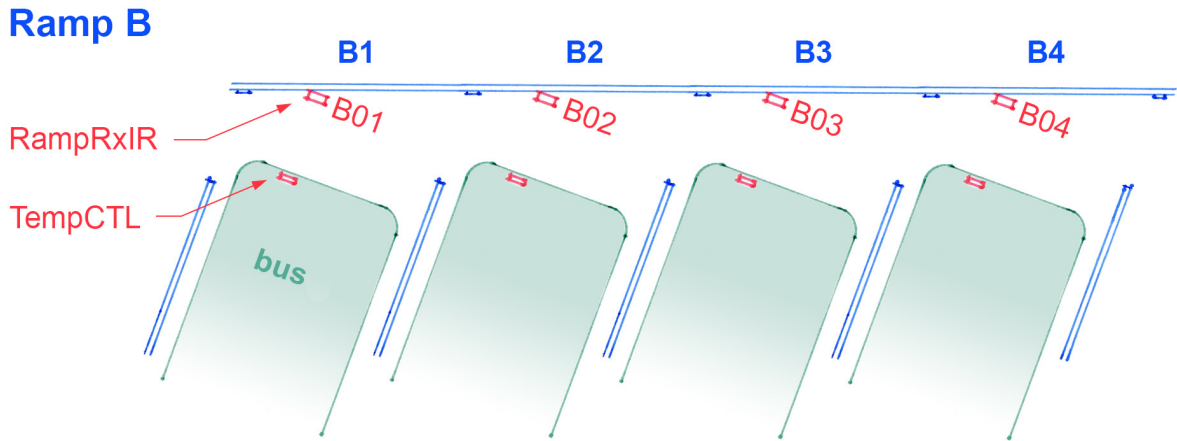
## Required accessories

Mounting plate with 400 \* 350 mm weatherproof roof surface.



IR-Illuminators  
Info for the bus's TempCTL

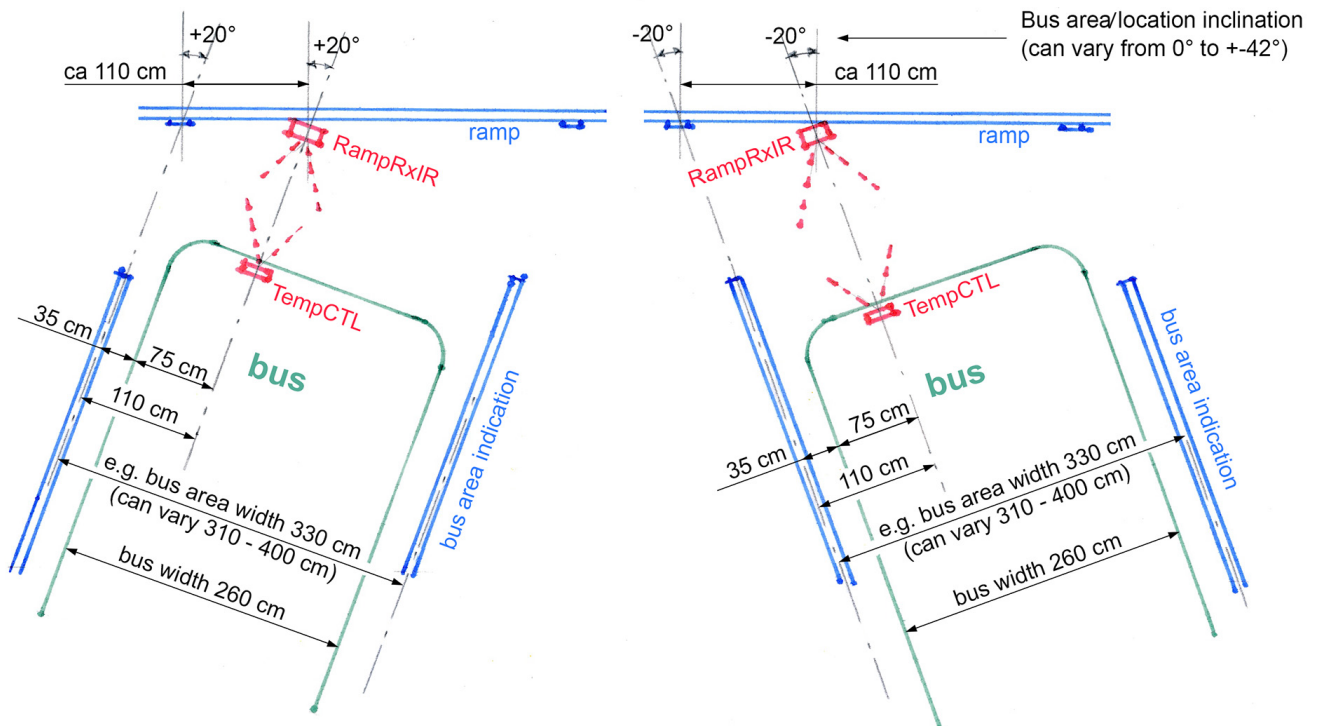
# Appendix: Principle sketch for bus connection to ramp



The RxIR ramp should be placed about 110 cm from the left side of the bus platform and at the same angle as the bus stop.

The Temp CTL should be located about 75 cm from the left side of the bus (outer) and be directed straight ahead in the direction of travel of the bus.

Both RampRxIR and TempCTL see about 30° from the center in both width and height (as a cone). Generally, the distance between RampRxIR and TempCTL becomes larger as the bus site angle is negative, which places greater demands on setting.



# Appendix: FAQ

## FAQ ThermoSense® control system

Frequently asked questions and answers

Temp CTL is also often called the "bus brain" or the bus sensor

RampRxIR is usually called the ramp unit

The base station is a unit that receives measurement values and battery charge voltage from Temp CTL

"Ramped" = heating and battery cables connected from ramp cabinet to bus

"set out" = When a bus is put out in traffic, and is away from the depot.

## The control system

**Q:** Is ThermoSense® a new heating system?

**A:** *No, it is a system that controls a depot's existing heating system. It tells of a bus need heat or heat is unnecessary according to a predetermined temperature. This means that the supply and environmental impact are minimized.*

**Q:** Can the system set temperature change?

**A:** *It is quite possible to change the on and off temperatures of the heat supply via a remote programming. This should be done overnight. It is then important that all buses are in the depot on this night, otherwise the instructions (remote programming) will not reach the buses that do not have contact with the depot's base station.*

**Q:** does the system allow the bus to get cold overnight?

**A:** *No, never below a predetermined operating temperature. That is, the system utilizes the bus's time constant for cooling. As soon as the bus goes a degree below a predetermined operating temperature, e.g. 7° C, the system tells the existing heating system that heat is needed. When the temperature has reached a degree above the predetermined temperature, it switches off the heat again. If the depot's own heat supply does not have sufficient capacity to heat, this is not due to the ThermoSense® system. The system tells the heat supply that heat is needed or not, i.e it controls the heat supply so that consumption is optimized.*

**Q:** Why are busses so cold in the morning?

**A:** *The bus should not be colder than 7° C. It is the preset and statutory temperature. If your company has requested a higher temperature, e.g. 10° C, then it is the lowest temperature the bus should have in a cold morning. If the bus is "ramped" but does not have contact with the bus sensor, the bus is heated continuously throughout the night and as long as it is parked. If the bus is colder than 6° C it may be: 1) that the capacity of the heat supply is too low and cannot heat the bus in a cold day. 2) that the bus's own heating system cannot receive heat as expected. 3) that the bus is not properly "ramped".*

**Q:** Why doesn't the bus get warm when it's really cold outside?

**A:** *The bus should not be colder than 7° C. It is the preset and statutory temperature. But if the depot's heat supply system does not have its full capacity and too many buses will share the limited capacity, no bus will get the expected heat it should have. ThermoSense® system cannot improve a heat supply system or increase the heat capacity, it only controls the system and distributes the resources where they are most needed.*

*That it does not work as it should be noticed only when it starts to get really cold. Keeping 5° C on a bus at -10° C requires about 10 kWh. If a heating cabinet can only supply 2.5 kWh (25%), the temperature of the bus will drop to below zero. Then ThermoSense® will constantly ask for heat without it being delivered as it should.*

**Q:** How does the system work on district heating supplied depots/ramps?

(This is the model Temp CTL and RampRxIR 1.85)

**A:** *The ramp unit is connected to the ramp cabinet (probably an XPND cabinet) and takes over the control of the cabinet. That is, the ramp unit turns on or off the heat supply from the cabinet depending on the "instructions" the bus sensor provides the ramp unit. When the temperature in the bus driver's environment goes one degree below the predetermined temperature, the bus sensor requests heat*

and when it has reached a degree above the predetermined temperature, it asks the ramp unit to shut off the cabinet's heat supply. In such a way, the bus is only heated when needed. For technical information, see Manual and Installation Guide.

**Q:** How does the system work on electricity-supplied depots with timer systems?

(This is the model Temp CTL and RampRxIR 1.85)

**A:** There are two options: 1) The timer system is switched off because the TermoSense® control function system only heats buses if necessary 2) The control function system is connected to the timer system and only optimizes the heat during the time the timer system has been switched on. Both options have their advantages and disadvantages. If the timer system is disconnected, the temperature of the bus will never be lower than the predetermined one during the night. Then the bus can be driven to laundry or workshop and pull out at short notice if another bus crashes. If the system is connected to the timer system, the energy is optimized only during the hours the timer is switched on. Then the timer system can be used manually. For technical information, see Manual and Installation Guide.

**Q:** How does the system with diesel heaters on bus work as a heat source or when a depot mixes electrical heating supply and diesel heating? (This only applies to the model Temp CTL + (plus) which has control output for controlling convectors, booster pump and diesel heaters locally inside the bus)

**A:** Here, the bus sensor, Temp CTL, takes over the control of the diesel heater. The sensor can be connected to the diesel heater by two different options: 1) The timer for the diesel heater is completely disconnected and TermoSense® completely takes over control of the heat supply. 2) also allows for manual timer of the diesel heater.

Both options have their advantages or characteristics depending on the bus company's own priorities.

**Q:** How can I identify the error if a bus does not get warm and every other bus has normal temperature?

**A:** There are four possibilities for the source of error. 1) That the bus is not properly "ramped". 2) The battery charge voltage is so low that the system is switched off and the doors on the buses are opened. 3) The ramp/heating cabinet cannot supply energy at full capacity. 4) That the bus's heat cartridge or heating line (depending on the energy system) does not work. If there is a fault in the TermoSense® system or the bus is faulty so that the bus sensor and the ramp unit do not get in contact, the heating cabinet (opens for heat supply) is prioritized to savings and the bus gets warm all the time it is parked.

One can do an initial troubleshooting by using the TSI and partly the bus. Open the TSI and search the bus and read the battery charge voltage. If the battery is so discharged that it will not start, the systems will be shut down one by one and, among other things, the doors will be opened for guaranteed passenger safety (which would be an emergency in traffic).

If there are no open doors, park the cold bus on another ramp location and "ramp" the bus correctly so that the heat supply starts. Open the TSI and see the development of the temperature. If the bus gets warm then the ramp/heat supply cabinet is faulty. If the bus is still cold, it is very likely that the bus cannot heat up (especially if other buses have normal temperature).

## Ramp units installed on each ramp (Ramp RxIR)

**Q:** How do I know that the ramp unit is in contact with the bus sensor?

**A:** When the bus sensor contacts the ramp unit, a red lamp at the bottom of the display of the ramp unit lights up in a box called "Contact". If you want double-check, you can put your hand in front of the transmitter at the contact lamp for one minute. Then the connection is disconnected and the lamp goes out. Remove the hand and you will hear a click and the lamp will come on again.

**Q:** Why is the hose cold (district heating system) although the bus is ramped and the bus should get heat?

**A:** The hose becomes hot when the bus needs heating in order not to get colder than the predetermined temperature (between 7-10° C). It can feel strange because of the old habit that as soon as a bus "ramp" starts the heat supply. TermoSense® utilizes the bus's time constant for cooling and no heat is supplied until the temperature has dropped to the predetermined minimum temperature.

**Q:** How does the ramp unit control the heat supply?

**A:** The ramp unit is relay-controlled and communicates with the temperature control unit (bus sensor, TempCTL) inside the bus via IR. When the bus reaches its ramp and is ramped, it immediately gets in contact with the ramp unit, the bus sensor says when it needs heat. It does this only when the temperature goes a degree below the predetermined temperature (between 7-10 ° C depending on the customer's desire).

**Q:** How does the ramp heat up the bus?

**A:** *Neither the ramp unit nor the system has the task of heating or improving the existing heating system. It controls and regulates heating systems so that the system only supplies energy for heating when it is really needed. If the supply system has insufficient capacity, or unevenly inscribed, then the insufficient heat resource between the buses is distributed as evenly as possible, which means that a larger number of buses will be operational than if the control function system were disconnected.*

## Sensors installed on the bus (Temp CTL)

**Q:** How do I know that the temp sensor has made contact with the ramp device?

**A:** *When the bus sensor contacts the ramp unit, a red lamp at the bottom of the display of the ramp unit lights up in a box called "Contact". You see it just when you park and turn off the bus and if you have parked right on your ramp.*

**Q:** Although if the bus is properly parked, the bus sensor does not get in contact with the ramp unit.

**A1:** *Check if the ramp is not distorted. Alternatively, you can also check that the cable connected to the bus is not removed. For more detailed information, see Manual and Installation Guide.*

**A2:** *During the winter, the bus's windows can become really dirty, snow-covered or frosted. It should work in most cases, but if it is extremely dirty or clogged, the IR transmission can be so weak that the bus sensor and the ramp unit do not get in contact.*

**Q:** How do I know that the bus sensor works?

**S:** *When the bus is parked on a ramp with a ramp unit and has contact then you can see on the bus sensor display that it works. You can see if the sensor requests heat, On or Off, and that the display shows the ramp letter and number. If you have a remote control (Bus Tool) you can easily use it to see the temperature in the bus and that it works properly. Alternatively, you can also check that it works in your TSI.*

**Q:** What does it mean that a bus sensor is not programmed?

**A:** *All bus sensors are programmed from the factory, currently with Version 1.85 (district heating) or upcoming 1.86 (diesel heater) New improved functions can be entered into already delivered units by re-programming, a so-called updating.*

**Q:** How do I activate a bus sensor when I have installed it on a bus?

**A:** *It goes completely automatic, as you power the bus sensor so it starts reporting to the Base Station, which reports on the Internet to the TSI. You can find instructions in the Manual and Installation Guide.*

*With the installation of a sensor in a bus, it is important to note the details of the bus sensor ID (6 digits), the bus ID (usually 4 digits), and the bus registration number. Send the information to [info@sensinet.se](mailto:info@sensinet.se) for software registration in the system. We thank the person who does this in advance. As the information is sent in, they are entered into the system and the bus is then presented in the system in a manner common to TX and drivers.*

*If a bus is moved to another depot, the system moves the bus's information to the new depot.*

**Q:** What does ON and OFF mean in the display?

**A:** *ON means that the bus is supplied with heat, ie the bus sensor has asked for heat and the ramp unit has opened to provide heat. OFF means that the bus sensor does not ask for heat and the supply is switched off because the bus temperature is higher than the predetermined temperature.*

## Outside temperature Sensor

**Q:** What role does an outdoor temperature sensor has for the heat control of the buses?

**A:** It specifies the outdoor temperature of the TSI web portal which gives an exact comparison criterion for the information regarding the behavior of the system, the heat supply and the bus depending on the outside temperature.

**Q:** Where do you find the outdoor temperature sensors?

**A:** It is located outdoors and near the base station's location in a neutral position, in the shade and protected from rain and wind.

## Base station

**Q:** How do I know if the base station is working?

**A:** You can see this in the TSI in Gateways where you can see the status of the base station. If you are next to or have just started a base station then wait a few minutes in front of the base station for the lights with the Internet and VPN to light up. Then you also know that the base station is in contact with the TSI and is functioning.

**Q:** How do I restart the base station?

**A:** You just need to pull out the plug and wait 10 seconds and then plug it in. If you have a router next to it, you can also restart it.

**Q:** How can I add TempCTL to the base station?

**A:** This is done automatically.

*Remember: write down which sensor ID number has been mounted in which bus, with bus ID and registration number. Send this to [info@sensinet.se](mailto:info@sensinet.se) with reference to companies and which depot. Please provide a contact number if the support team needs to ask any question.*

## TSI

**Q:** What is the TSI?

**A:** It is the web portal where all information is recorded. There you will find your depot and all buses with a registered bus sensor and all active ramp units. There you can see information in real time and history. You can see the bus temperature, temperature behavior, battery charge voltage and battery behavior at different stages. You can even see if the bus is on a specific ramp or only registered that it is on the depot. It is a good work and analysis tool for workshop, traffic management and the property unit (ramp guards), etc.

**Q:** How do I log in?

**A:** You just need to ask the person in your company who has been assigned the overall responsibility. You also need an email address to receive your login information.

**Q:** Why don't I see which ramp the bus is parked on?

**A:** If the bus is visible on the overview screen but not on the ramp, it shows that the bus is in the depot (it has contact with the base station). The reason is that the bus sensor does not get in contact with the ramp unit: 1) The bus is mis-parked 2) The ramp unit is distorted/wrong angle 3) The ramp unit is distorted/wrong angle 4) The ramp unit is covered with something 5) The ramp unit is disconnected

**Q:** Why do the boxes get gray in the overview?

**A:** These are the buses that are set off and have left the depot. Those buses have no contact with the base station. Then you know that the bus is in traffic or some other place. If you click on the box, all the information will appear and the time the bus left its place. If the exit unit is located at the depot's exit, the exact release time is obtained.

**Q:** Why do some buses disappear from the overview?

**A:** If the bus has not been in contact with the base station for 36 hours, the box disappears. It often happens that buses change depots and then one avoids confusion where the bus should be. The bus's route appears on the depot it is parked. You can easily do a search on the bus in the TSI and find out where it is parked or where it was last parked.

**Q:** Why do I sometimes see only six digits (eg 026.192) in the Identifier column?



**A:** This is a sensor's unique ID. This means that the bus sensor is in contact with the base station and if it shows a ramp position that it has contact with the ramp unit. The sensor works but it has not been reported which bus it is mounted in. Please note the details of the sensor ID (6 digits), the bus ID (usually 4 digits), and the bus registration number. Send the information to [info@sensinet.se](mailto:info@sensinet.se) for software registration in the system. We thank the person who does this in advance.

**Q:** Why does it stand at position 000 and not ramp position?

**A:** Because it does not have contact with a specific ramp unit. It has contact with the base station and is located at the depot. If it is parked on a ramp it may be that it does not get in contact with the ramp unit. Check that the bus is parked correctly or if the ramp unit is covered or turned away.

**Q:** Why is it constantly showing -61° C?

**A:** Then the temp probe on the bus sensor is broken or removed. Feel free to physically look at the bus sensor that the probe is not broken due to impact or the like. The probe is replaceable as a spare part.

**Q:** How can I get an overview of alarms?

**A:** You will find on the alarm overview and alarm reports in the TSI. Most alarms are because the battery charge voltage is too low and warns that both the bus may have starting problems or that other systems in the bus are switched off. The other common reason is that the bus has been 5.0 ° C or less for longer than one hour.

## Driving views / Screens

**Q:** Why can't I see all the buses on the screen?

**A:** The driver's view or screen view shows only those buses that are in the depot and where it stands ramped. If the bus is not shown and no ramps are installed, the bus sensor does not have contact with a ramp unit: 1) The bus is not parked at ramp 2) the bus is so poorly parked at ramp that it does not get contact 3) the bus sensor is faultily wired and does not contact the ramp 4) the ramp unit is misaligned or covered.

**Q:** Why can I see the bus but not where it is parked or see the ramp?

**A:** Displays only the bus and no ramp location, the bus sensor does not have contact with a ramp unit: 1) The bus is not parked at ramp 2) the bus is so poorly parked at ramp that it does not get contact 3) the bus sensor is faultily wired and does not contact the ramp 4) the ramp unit is misaligned or covered.

**Q:** Why do I see a different depot than my own?

**A1:** Make sure you have the right link to your depot. You can see the name of the depot in the link.

**A2:** If it still does not work, empty your computer's cache (you can do that on the search engine settings and history). It is quite a common problem that old caches block both links and new passwords. Then use the link again.

**A3:** When you start up the big screen, the depot name is displayed before the buses are displayed.

**Q:** Why can't I see my depot even if I have copied the link?

**A1:** You should then try to empty your computer's cache (you can do that on the search engine's settings and history). It is quite a common problem that old caches block both links and new passwords. Then use the link again.

**A2:** Testing aids: When you start up the big screen, the depot name is displayed before the buses are displayed.

## Activation key

**Q:** What is an activation key?

**A:** It is a handy little tool. As a customer, a responsible contact person has got one or more keys (a magnetic key that looks like a little key holder. See the manual and installation guide. You uses this to "key up" a base station and to insert new sensors into the system. can also use keys out in the field and see which temperature a sensor indicates and/or that it has contact with the base station.

**Q:** How to use the key?

**A:** The key is placed at the designated point on a base station or sensor. See the Manual and Installation Guide. When the key is contacted, it appears on the device display.

## Designations

**Q:** What does all the different designations of the products mean?

**A:** *Those are general radio technical abbreviations:*

**Tx:** *"Transmit". All products with Tx are transmitters (outside temp sensor is called TempTx)*

**Rx:** *"Receiver". (E.g. alarm-receiver)*

**Rxlr:** *receiving infrared information (ramp unit receiving infrared instructions)*

**Ctl:** *"Controller" (the bus sensor Temp CTL. It could also have been called TempTxCtl but...)*

*Since we have developed into the unique location to have an entire system of transmitting sensors, receiving units, measuring units and controlling units, which can also communicate via wire (Wire), wireless via radio and infrared messages, it is necessary to have a nomenclature system (Mnemonics) that uniquely distinguishes and reasonably understands all the products.*

## SMS-alarm

**Q:** Who gets the alarm and how do I know what kind of alarm it is?

**A:** *It is your system administrator who decides who should be the alarm receiver. There are three different alarms to jointly determine: 1) Too low temperature 2) Too low battery charge voltage 3) Heat/fire in a bus 4) Too high battery voltage, "boiling" of the battery that destroys it.*