ECKELMANN

Operating instruction

Receiver Module WR 300 / WR 400

Version V1.09 / V1.00

Wireless Sensors TS 30 W / TS 30 XW

Before commissioning and use, please check that this is the latest version of the document.
With the publication of a new version of the documentation, all previous versions lose their validity.
Errors and technical modifications are expressly reserved.

The current operating manual and information such as data sheets, more detailed documentation and FAQs are available for you on-line in E°EDP (Eckelmann ° Electronic Documentation Platform) at
www.eckelmann.de/elds

You reach all relevant documents for this component directly using the QR code:

Information on safety and connection instructions
are described in detail in chapter 1 "Industrial safety notes".

Notice:

Conventions

Explanation of 'General Instructions'

A general instruction is composed of two elements:
1. A pictogram of a hand at the side of the page as well as
2. The actual text:

For example:

☞ Further information on the device's degree of protection is contained in the chapter "Technical Data".

Explanation of 'Safety Instructions and Hazard Warnings'

Safety instructions or hazard warnings are composed of four elements:
1. The pictogram (warning sign / symbol) at the edge of the page.
2. A short, concise description of the danger.
3. A description of the possible consequences.
4. A catalogue with prevention measures.

For example:

Warning - hazardous electrical voltage!
Danger of electric shock! BEFORE and AFTER connection it
must checked that the 230 V AC relay outputs are **off load!**

On the following pages the warning signs and symbols employed for
the safety instructions and hazard warnings in this documentation are described in more detail.

Warning Signs and Symbols Employed

Explanation of the warning signs and symbols employed for the safety instructions and hazard warnings in this documentation:

- **Attention symbol - general hazard warning**

1. Hazard warning
The attention symbol indicates all safety instructions in this operating instruction and service instruction, which, if not observed, could result in danger to life and limb. Carefully comply with the work safety instructions and proceed with special caution in these cases.

2. Attention
The attention symbol highlights guidelines and regulations, instructions and correct working procedures that must be carefully observed in order to prevent damage to or destruction of LDS components or a malfunctioning (for example to avoid damage to goods).

Failure to observe the attention symbol can result in personal injury (in extreme cases serious injuries or death) and/or material damage!

- **Voltage symbol - warns of hazardous electrical voltage**

This work safety symbol warns of danger from a hazardous electrical voltage,
with potential consequences such as serious injury or death.

- **ESD symbol - warns of electrostatic sensitive components and assemblies**

This symbol indicates electrostatic sensitive components and assemblies,
for details see chapter 1.5.

- **Note symbol**

The note symbol highlights practice tips and other useful information contained in this operating instruction and service instruction.

- **Battery disposal symbol**

Never dispose of this product with other household waste. Please inform yourself of the local regulations for the separate disposal of electrical and electronic products. The correct disposal of your old equipment will protect people and the environment from possible negative effects.
You will find further information in the chapter "Decommissioning and Disposal".

ECKELMANN

1 Safety instructions

The safety regulations, codes and notes contained in this section must definitely be observed and complied with at all times. During repairs on the entire LDS system, the accident prevention regulations and general safety instructions must be observed. Important information (safety instructions and hazard warnings) are indicated by corresponding symbols (see page 1 of the chapter "Conventions").
Follow these instructions in order to prevent accidents and danger to life and limb, as well as damage to the LDS system.

Warning - hazardous electrical voltage!
Danger of electric shock! Beware of external voltage at the digital inputs and outputs!
All device connections/plugs are **only** to be plugged in, unplugged and/or wired when **off load**.

- This operating instruction is an integral part of the equipment. It **must** be kept in the proximity of the equipment and must be stored for future use, so that it can be referred to when necessary. To avoid operating errors, the operation instructions must **always** be kept available for operating and maintenance staff, see Chapter 1.2.

- For safety reasons, the equipment must not be used for any application other than described in the operating instruction i.e. only for the intended use, see Chapter 1.3.

- Before using the equipment, always check that its limits are suitable for the intended application.

- Check that the electric power supply is correct for the equipment before connecting it to power.

- When using uncoded plug connectors, it is possible to connect them so that there is a danger to life and limb! If this cannot be ruled out, coded plug connectors must be used.

- Specified ambient conditions (e.g. humidity and temperature limits) must be observed and complied with in order to avoid malfunctioning (see Section "Specifications").

- Check correct wiring of the connections before switching on power to the equipment.

- Never operate the equipment without its casing. Before opening the casing the equipment must be switched to zero potential.

- Note and observe maximum load on relay contacts (see Section "Specifications").

- Contact the supplier in any malfunction.

- Note that all leads running to and from the controller- especially those of the CAN bus - must be shielded and installed sufficiently clear of other leads carrying live power. Doing so will avoid faulty measurements and will protect the equipment from external interference via the analog inputs.
Parallel connection of RC elements is recommended for applications in a critical environment.

1. According to experience, error message transmission is not yet fully functional during commissioning (no telephone line laid etc.) In such cases it is urgently recommended to monitor the controller via the CAN bus using a system centre, store computer or an operator terminal, and enable error message transmission e.g. using a GSM modem via a mobile telephone network. In stand alone operation, or as an alternative to monitoring with the store system centre / computer/ operator terminal, an alarm contact on the controller must be used in order to realise error message transmission via a telephone network.

For further information on the CAN bus, see the operating instruction
"Basic and General Safety and Connection Instructions".

ECKELMANN

Work on electrical equipment may **only be undertaken by authorized and duly trained personnel** (as defined by DIN/VDE 0105 and IEC364) with full observance of the currently valid regulations contained in the following:

- VDE Regulations
- Local safety codes
- Intended use   see chapter 1.3
- VBG4 - Five Safety Rules   see chapter 1.4
- ESD precautions and rules   see chapter 1.5.
- Operating instructions

1.1   Disclaimer in the event of non-compliance

These operating instructions contain information on the commissioning, function, operation and maintenance of the controls and of the associated components.

Observance of these operating instructions is a prerequisite for safe and trouble-free operation.

1.2   Personnel requirements, requirements on staff

Special skills are required for project planning, programming, assembly, commissioning and maintenance work. This work may be performed by qualified and specially trained staff.

The staff involved in installation, commissioning and maintenance must have received the special training needed for them to work on the unit and on the automation system.

The project planning and programming staff must be familiar with the safety concepts involved in automation technology.

Expertise is a requirement for any work on electrical systems. Work on electrical installations may only be performed by trained electrical specialists (or may only be performed when directed or supervised by them). The applicable regulations (e.g. DIN EN 60204, EN 50178, BGV A3, and DIN VDE 0100/0113) must be followed.

The operating staff who deal with the unit/machine and the controls must be correspondingly trained and familiar with the operating instructions.

ECKELMANN

1.3 Intended use

This control system may only be used for the purpose for which it is intended:

The receiver module WR 300 / WR 400 and the wireless sensors has been designed for use as temperature recording with the intended functional scope as described in these operating instructions, and it is to be used under the environmental conditions in these instructions.

Follow the safety instructions, as well as the instructions on installation, commissioning, operation and maintenance. Only THEN should you start commissioning or operating the machine/system.

The safety and function of the machine/unit is only assured in the use for which it has been intended.

Never use the machine/unit, its components, assemblies or parts of it for a different purpose.

The installation may be only operated for the first time when the entire unit has been shown to conform to the EC Directives.

1.4 BGV A3 - Five safety rules

The following rules must be strictly observed:

1. **Disconnect electric power:** Disconnect power at all connections of the entire installation on which work is to be carried out.

   Warning - hazardous electrical voltage!
   Beware of possible external power supplies! **BEFORE and AFTER** connection it must be checked that the controller is **off load**! All device connections/plugs are only to be plugged in, unplugged and/ or wired when off load.

2. **Secure against reconnection of power:** Tag the disconnected equipment with the following information:
   - What has been disconnected from power
   - Why it has been disconnected
   - Name of person who disconnected power
   - Use a suitable lock-out (e.g. padlock) to prevent reconnection of power.

3. **Make sure that power is off (authorized and duly trained personnel only):**
   - Check with voltmeter immediately before use.
   - Check that power is off on all connections at the disconnection point.
   - Check that power is off on all connections at the place of work.

4. **Ground and short circuit:** Ground and then short circuit all electrical parts at the place of work.

5. **Cover or bar off adjacent power-carrying parts:** Any equipment carrying power adjacent to the work area must be covered by suitable means (e.g. insulating cloths or panels).

1.5 Electrostatic sensitive devices (ESDs)

Electronic components and assemblies (e.g. printed circuit boards) are vulnerable to electrostatic discharge. Regulations for handling and working with electrostatic sensitive devices must definitely be observed and complied with, see also section 1.5.1!

All electrostatic sensitive devices (ESDs) are identified by the warning sign illustrated. Electrostatic discharge is caused by friction of insulating materials (e.g. floor coverings, synthetic fiber clothing, etc.).

Even slight charges can cause components to be damaged or destroyed. Damage cannot always be ascertained directly and it may take time for the component to actually fail in operation.

1.5.1 ESD - Rules for handling and working

Transport and store ESDs only in the protective packaging provided.

Avoid materials that may produce electrostatic discharge, for example

- Plastic containers and table tops
- Synthetic fiber clothing
- Plastic-soled shoes
- Plastic file covers
- Styrofoam packaging
- Computer monitors, etc.

Preferably wear the following:

- Cotton work clothes
- ESD shoes with conductive soles or leather soles

Use the following:

- Conductive flooring
- ESD workstations equipped with suitable tools (grounded soldering guns, antistatic wrist straps, etc.)
- Conductive ESD bags, conductive plastic containers, IC tubes or cartons lined with conductive foam
- Containers and worktops made of wood, metal or conductive plastics or paper bags

1.6 Abbreviations used

DIN	**D**eutsches **I**nstitut für **N**ormung e. V.
EGB	**E**lektrostatisch **G**efährdete **B**auelemente oder Baugruppen
ESD	**E**lectro-**s**tatic **d**ischarge (**E**lectro **S**ensitive **D**evices)
VDE	**V**erband **d**er **E**lektrotechnik **E**lektronik Informationstechnik e.V.
IEC	**I**nternational **E**lectric **C**ommittee
BGV A3	Employer's Liability Association regulations for health and safety in the workplace

2   System Design of WR 300 / WR 400 / TS 30 W

☞ All the details of the "WR 300 Receiver Module" described in this document always refer to the "WR 400 Receiver Module" as well. Any differences in function or features between these two control components are only explained where they have an effect.
The main features distinguishing the two variants:
The WR 400 receiver module (discontinued) is designed for both operation within the E*LDS system (CAN bus) as well as stand alone operation, see chapter 4.1.7. In addition, it is equipped with a display interface for connection to an operator interface of the BT 300 series.
Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

2.1   Introduction

The receiver module can monitor up to 100 wireless sensors of the type TS 30 W, i.e. integrate them into the E*LDS system. The electronics are contained in a casing for wall mounting. Up to 4 receiver modules can be used within one E*LDS system. Meaning of the abbreviations:

R =   **R**eceiver
TS =   **T**emperature **S**ensor
W =   **W**ireless
X =   e**x**ternal temperatur sensor
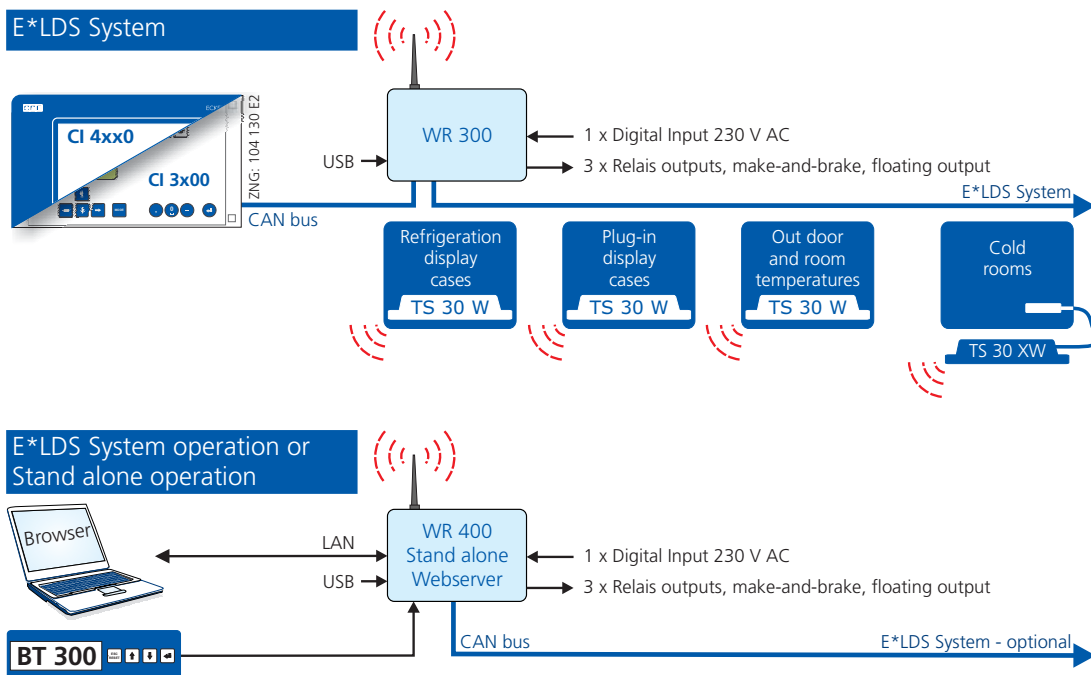
☞ An important precondition for the integration of receiver modules in the E*LDS system is that the store computer is fitted with a firmware version ≥ V5.12 and that the operator terminal is fitted with a firmware version V5.06 and the PC software LDSWin with a version ≥ 2.4.3.4056. The system centre should be fitted with a firmware version ≥ V6.2.0.

- **Receiver module**

Features:	Receiver module for wireless sensors
Radio frequency:	868 MHz

Interfaces:

1 x CAN bus IN 1 x CAN bus OUT	Communication in E*LDS system
2 x antenna (ANT1 / ANT2):	For receiving up to 100 wireless sensors TS 30 W (antenna connection ANT2 is currently not used)
USB	A firmware update can be carried out via the USB interface (type B), see chapter 5.5.
Power supply:	230 V AC, 50/60 Hz

Digital inputs and outputs:

1 x digital inputs	230 V AC, potential-free
3 x relay outputs	230 V AC / 6 A (3 changeover contact) for e.g. telephone dialling device (PRIO 1/2), signal transmitter etc.

WR 400 only - discontinued:

The receiver module WR 400 has been specially designed for stand alone operation.

Real-time clock	With power reserve, lithium cell
Data memory	For storing the temperature data in stand alone operation

Interfaces:

DISPLAY:	Connection for operator interface of the BT 300 series
LAN interface	For incorporating the integrated web server in a network. The temperature data can be accessed using a web browser (e.g. Mozilla Firefox).

ECKELMANN

- **Wireless sensors**

TS 30 W   **TS 30 XW**

Features:	Wireless sensor for the transmission of temperature data
Measuring range:	-40 °C .. + 80°C
Radio frequency:	868 MHz with automatic adjustment of the transmitter power for optimal battery lifetime
TS 30 W	Wireless sensor with integrated temperature sensor (standard)
TS 30 XW	Wireless sensor with external temperature sensor Applications include coldrooms/cold storage cells or other conditions, which, due to their construction, shield or strongly absorb radio waves. The actual temperature sensor is located at the end of the 3 m long cable and is mounted in the coldroom, i.e. the cold storage cell. The wireless sensor TS 30 XW transmits the data to the receiver module.
Integrated reed contact	For activating ("waking up") the wireless sensor
Voltage supply:	Internal battery, lifetime under standard operation 10 years (for more details on standard operation see chapter 4.2.5).

2.2   New features compared to previous versions

WR 300 - Version 1.09

- Defrost recognition for alarm suppression
    - automatic
    - using up to 3 timers
    - via the adoption of the defrost status of an assigned case controller UA 300, UA 400 or UA 410

- Message list (for up to 50 messages of the priorities 1..99)

- Alarm relay function (Prio1, Prio 2 and AUX)

- Alarm suppression via the digital input

- Service mode

WR 400 - Version 1.00

- Operation and configuration via a web browser

System Design of WR 300 / WR 400 / TS 30 W

Notice:

3   Application of WR 300 / WR 400 / TS 30 W

☞   In order to guarantee interference-free operation in respect of the radio technology, basic guidelines must be observed. See chapter 5.1 "Basics of radio technology".

3.1   Receiver module

The WR 300 and WR 400 (discontinued) receiver modules have been developed for the monitoring of up to 100 wireless sensors of the type TS 30 W. The acronym WR stands for **W**ireless **R**eceiver.

The temperatures to be measured are captured by the wireless sensors and transmitted to the receiver module per radio signal. The data is analysed in the receiver module and routed to the connected system centre / store computer via the CAN bus.

The parameterisation of the receiver module and the corresponding wireless sensors as well as the temperature limits and alarm priorities can be carried out locally using an operator interface BT 300 x (only WR 400), an operator terminal, system centre, i.e. the store computer, or via the LDSWin software.

WR 300:   The receiver module is designed for integration in the CAN bus of the E*LDS system.

WR 400:   The receiver module is designed for integration in the CAN bus of the E*LDS system **and** for stand alone operation

The electronics is contained in a casing which can be mounted on the wall using 4 screws.

Further features of the receiver module:

• Administration and configuration of all wireless sensors TS 30 W connected to the receiver module

• Monitoring of the wireless sensors TS 30 W for high and low temperature with alarm function

• Transmission of all measurement values from the connected wireless sensors TS 30 W to the system centre or store computer

• Integrated real-time clock with power reserve so that the clock continues to run even in the event of a power interruption (only for devices for stand-alone operation)

• 3 relay outputs (changeover contacts, 230 V AC, 6 A)
  for messages of the PRIO 1/2 or for alarm signals (e.g. connection of a horn etc.)

• 1 digital input for alarm suppression

• WR 400 only:
  - Connection of an operator interface BT 300 x
  - LAN interface
  - Real-time clock with puffer battery
  - Internal data memory for temperature recording
  - Operation and configuration via a web browser

ECKELMANN

3.2   Wireless sensor

The wireless sensors TS 30 W were developed for the measurement, monitoring and recording of temperatures. The wireless sensors are housed in a hermetically sealed casing and can be installed in e.g. deep-freeze cabinets, vegetable racks, on ceilings or any other location of one's choice using screws, double-sided tape or cable ties (see chapter 5.2.7 - Installation TS 30 W).

For rooms which cause an excessive absorption of the radio signal (e.g. cold-storage cells), the wireless sensor TS 30 XW is available. This is fitted with an external sensor attached to the end of a 3 m long cable. This enables the actual sensor to be placed in the cold-storage cell and the transmitter installed at a site outside the cold-storage cell with good transmission properties.

Characteristics of the TS 30 W / TS 30 XW

- Measurement range: -40 °C .. + 80 °C

- Unobstructed radio range: approx. 80 m

- Configurable updating interval from 5...30 min.

- No battery change required
  (lifetime under standard operation 10 years, see also chapter 3.2.5 - Standard Operation)

- Automatic adjustment of the transmitter power for an optimal battery lifetime

- Maintenance free

- **TS 30 XW only**: The actual temperature sensor is attached to a 3.0 m long cable and is installed at the measuring point (e.g. in the coldroom, i.e. the cold-storage cell).

3.3   Version update

A firmware update is only to be carried out by trained staff or factory-side by the manufacturer.
A firmware update for the wireless sensors TS 30 W / TS 30 XW is not planned.

All settings on the receiver module should be backed-up **prior** to the update by saving them to the PC software LDSWin as a change of version can lead to a loss of the setpoint values.
After the firmware update the saved settings can be reloaded into the receiver module from LDSWin.

4 Function of WR 300 / WR 400 / TS 30 W

☞ The parameters referred to in this chapter are described in more detail in the chapter "Menu Structure".

4.1 Function of the receiver module

A total of 4 receiver modules can be integrated in the E*LDS system, whereby each receiver can administer up to 100 wireless sensors. Furthermore, the WR 400 receiver module is equipped with an internal data memory for recording temperature data during stand alone operation, see chapter 4.1.7.

Further functions are available as follows.

4.1.1 CAN bus interface

The receiver modules are integrated into the E*LDS system via the CAN bus. The configuration as well as the parameterisation of the receiver modules is conducted via the system centre, the store computer, the operator terminal or by means of the LDSWin PC software.

4.1.2 USB interface

A firmware update can be carried out via the USB interface (type B), see chapter 5.5.

4.1.3 DISPLAY interface

WR 400 only

In future, the direct parameterisation of the receiver module can be carried out via an operator interface of the BT 300 series connected via the DISPLAY interface (terminals 1..6).

4.1.4 LAN interface

WR 400 only

A notebook / PC can be connected via the LAN interface in order to view and parametrize the stored temperature data in a web browser (e.g. Mozilla Firefox). The measured values are also available in XML format. Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

4.1.5   Digital input

Warning - hazardous electrical voltage!
Danger of electric shock! BEFORE connecting and disconnecting it must be checked
that the 230 V AC digital input is **off load!**

The receiver module is equipped with a 230 V AC digital input (terminals D11/D12) for the purpose of alarm suppression.

As soon as a signal (230 V AC) is applied to the digital input, the receiver module's alarm suppression is activated. As a result, the two alarm relays (PRO1: 15/16/18 and PRIO2: 25/26/28) as well as the relay output AUX (terminals 35/36/38) are deactivated, regardless of whether alarms are present or not.

The actual status is dependent on whether the signal at the alarm relay is inverted or not. The inversion is configured in menu item 6-4 of the receiver module (only possible in Superuser mode):

Configuration Relay PRIO1/PRIO2/AUX	Behaviour of the relay when		
	No Alarm	**Alarm**	**Alarm suppression**
Signal inverted: Yes	Activated LED on	Drops out LED off	Activated LED on
Signal inverted: No	Drops out LED off	Activated LED on	Drops out LED off

Factory side, the signal at the alarm relay is inverted.

Furthermore, during alarm suppression no new alarms can be transmitted from the receiver module via the CAN bus to other participants, i.e. neither the store computer or a connected system centre, operator terminal can receive or transmit the message.

During alarm suppression any alarm incidents are only recorded in the receiver module's internal message list.

Following the end of alarm suppression (no 230 V AC signal at the digital input), all active alarms are transmitted to the system cenztre, store computer and operator terminal. The relays are activated in accordance with the remaining active alarms. The relay output (AUX) is also activated when there is still a PRO1 or PRIO2 alarm.

With an inverted relay configuration, it must be taken into account that when the alarm suppression is activated the relays drop out briefly as soon as the receiver module power supply is interrupted.

ECKELMANN

4.1.6   Digital outputs

Warning - hazardous electrical voltage!
Danger of electric shock! BEFORE connecting and disconnecting it must be checked that the 230 V AC relay outputs are **off load!**
Low voltage **and** safety extra-low voltage must **not** be applied together at the relay outputs 15/16/18, 25/26/28 and 35/36/38.

4.1.6.1 Alarm outputs

The receiver module is equipped with one digital alarm output (zero-potential relay contact) for each of the two alarm priorities 1 and 2, e.g. for triggering a telephone device (terminals PRIO 1: 15/16/18 - PRIO 2: 25/26/28). If an alarm is registered, the assigned output for the corresponding priority is activated.

In the event that the output is already activated then it is deactivated for a brief moment and subsequently reactivated (new-value signal).

The respective alarm outputs are automatically deactivated when e.g. following the pressing of the *ALARM-RESET* button no alarms with the corresponding priority are contained in the alarm list.

4.1.6.2 Multifunctional output AUX

In addition to the prioritised alarm outputs, the controller is also equipped with a change-over contact (AUX) which can be used to connect e.g. an external acoustic alarm transmitter via terminals 35/36/38. The relay always switches when a PRIO1 or PRIO2 alarm is triggered.

When the alarms are acknowledged, the relay is deactivated and the alarm transmitter is muted.

4.1.7 Stand Alone Operation - WR 400 only

The receiver module WR 400 has been specially designed for stand alone operation. It is equipped with a real-time clock, a buffer battery (see chapter 4.5), an internal data memory for the recording of temperature data as well as an integrated web server. This enables temperature monitoring to be conducted independent of the E*LDS system, thus opening up new use options and applications for the TS 30 W and TS 30 X wireless sensors.

A LAN interface is available on the left hand side of the WR 400 receiver module's housing. Using this interface the receiver module can be integrated into a network (A) or connected and parametrized directly to a notebook or PC (B).
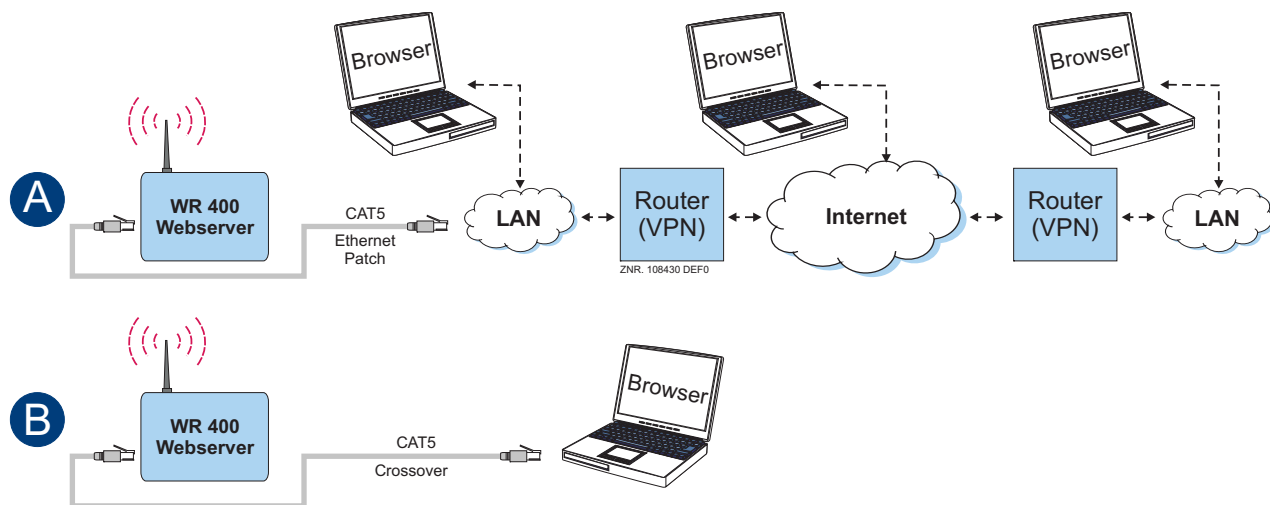
The temperature data and status information recorded in the receiver module can be accessed via the integrated web server and can be displayed on a screen using an web browser, see chapter 4.1.7.1.

☞ Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

4.1.7.1 Displaying temperature data and status

In order to display the temperature data and status of the wireless sensors all that is required, following the integration of the WR 400 receiver module into the network, is to enter the receiver module's IP address in the address list of the web browser.

☞ Information on connecting via LAN as well as the configuration of the receiver module's network address are explained in more detail in chapter 5.3.

Factory side, the receiver module is configured with the following network address:

IP address: 192.168.161.2
Subnet mask   255.255.255.0

Calling up the web server:

Start the web browser (e.g. Mozilla Firefox) and enter the IP address *192.168.161.2* or *http://192.168.161.2*:

The screen for the receiver module's integrated web server now opens and the display shows the current temperature data and the status of the wireless sensors:
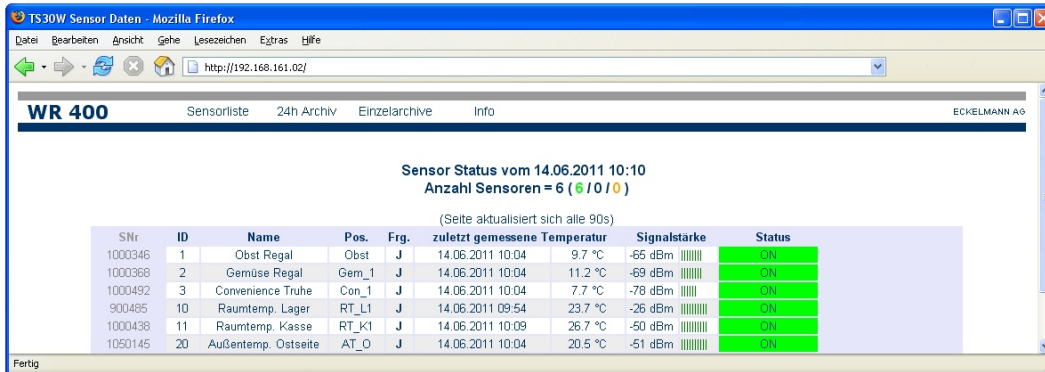
The screen displays the current temperature data and the status of the wireless sensors.

☞ If the screen fails to open and a screen with the information "Page not available" opens instead, then the IP address has been entered incorrectly or the receiver module gateway address has not been assigned or incorrectly assigned.
Remedy: Test the network configuration, see chapter 5.3.

By clicking "24h archive" in the navigation bar the 24h list is retrieved:
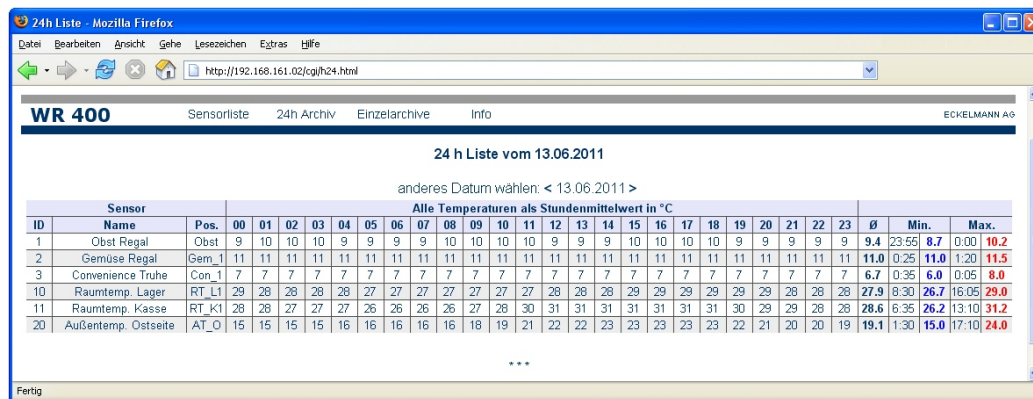
☞ **Tip:** If required, the 24h list can be printed out via the web browser's print dialog.

4.2 Function of the wireless sensors TS 30 W / TS 30 XW

All the wireless sensors assigned to the receiver module can be parameterised via the system centre, store computer, system centre, webbrowser (Wr 400 only) or the PC software LDSWin. The identification of the individual wireless sensors is carried out via the unique serial number which is clearly located on the side of the sensor casing:

Care is to be taken that there are no obstructions between the wireless sensor and the receiver module antenna and that the sensor is not shielded e.g. by metal plates. For more information on suitable installation points and their analysis see chapter 5.1 - "Basics of Radio Technology".

☞   Detailed information on the commissioning of the sensors is contained in chapter 5.2.7.

4.2.1 Transmission interval

In the event of radio contact with the receiver module, the wireless sensor records a value every 5 minutes. Factory side, these values are transmitted to the receiver module every 15 minutes. The transmission interval can be changed to 5, 10, 15, 20 or 30 minutes via the menu item 2-2-1. If the transmission interval is lowered, the measured values are transmitted to the receiver module more frequently (see also chapter 4.2.5).

4.2.2 Resolution

Factory side, the resolution of the temperature sensor is preset at 0.25 K. Via menu item 2-2-1, the measuring accuracy can be set to either 0.1, 0.2, 0.25, 0.5 or 1.0 K.

4.2.3 Data recording in the event of a loss of radio contact

During the service life of a sensor a range of situations can arise resulting in a loss of radio contact (e.g. the lowering of metallic blinds covering refrigerated display cases, the switching off of the receiver module, or changes in the environmental conditions of the transmission path etc.).

If the sensor no longer has any contact with the receiver module (Sensor Status = Failed, see menu item 1-1) it still to record a value every 15 minutes. By this means, 420 values can be temporarily stored by the sensor, which corresponds to a time period of 4 days and 9 hours.

In this mode the sensor only attempts to establish a connection with the receiver module approx. every 30 minutes.

☞   **Praxis tip**: In order to initiate contact with the receiver module during commissioning the wireless sensor can be activated at any time using the WAKE ME UP magnet (see chapter 4.3.10). By this means, the sensor attempts to establish immediate contact with the receiver module.

As soon as the sensor has re-established contact with the receiver module it transmits all values recorded up to this time to the receiver module.

> If there is no connection between the receiver module and the system centre / store computer during the resumption of radio contact, all the values recorded (buffered) by the wireless sensor will be lost!

4.2.4 Automatic deactivation

If a wireless sensor is unable to establish **any** contact with a receiver module for a period of 4 days and 9 hours it automatically deactivates itself ("goes to sleep"). In order to switch wireless sensors back on, they must be reactivated ("woken up") using the activation magnet "WAKE ME UP". For detailed information on the activation of sensors see chapter 5.2.10.

> Data recorded (buffered) before the automatic deactivation will be lost (see chapter 4.2.3).

> Wireless sensors are deactivated factory side!

4.2.5 Standard operation

The wireless sensors are pre-parameterised factory side and attain a battery life of 10 years when the following conditions are observed:

- Transmission interval: 15 minutes, see chapter 4.2.1
- Resolution: 0,25 K, see chapter 4.2.2
- Boundary conditions: The sensor may only lose contact with the receiver module
for a maximum of 5 hours/day
- Operation temperature: -40 °C .. +50 °C

In its storage state the energy consumption of the wireless sensors is considerably lower than that during operation, however it is still present. Please note that long storage periods can compromise the battery lifetime, therefore storage times should be kept as short as possible. Storage at low temperatures enhances the battery lifetime.

4.2.6 Service mode

In order to prevent false alarms during maintenance or repair work on cases, the wireless sensors positioned in the cases can be deactivated for the duration of the work. The service mode must be switched on separately for each of the effected wireless sensors via the parameter Wartungsmodus (menu 2-2-1).

If the service mode is switched on, then for every wireless sensor

- all temperature alarms or failure alarms are reset,
- no new alarms are activated and
- no temperature data is shown in the 24h list any more.

If the service mode is inadvertently left on, it is automatically deactivated:

- after at least 4 hours when the temperature has fallen by more than 2 K below the alarm limit and it was previously at least 3 K above the alarm limit on one occasion.

However, this is only possible when the wireless sensor has radio contact to the receiver module when in the service mode so that it can continually transmit temperature data:
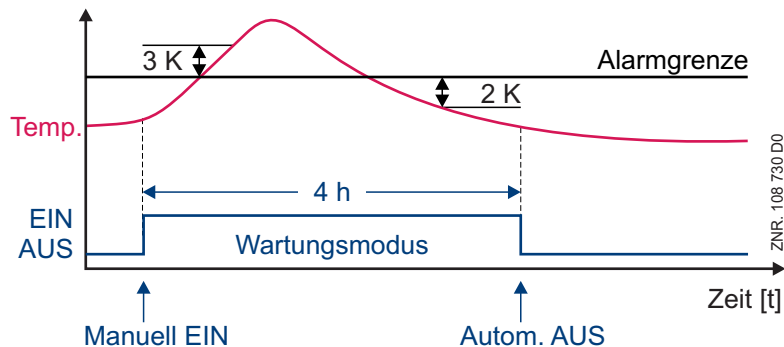
- independent of the temperature profile: at the latest 4 days after the activation of the service mode.

After terminating the service mode any wireless sensor alarms still present are transmitted. For temperature alarms and failure alarms the delay time starts afresh.

4.2.7 Defrost recognition

The defrost recognition function has been designed in order to avoid e.g. false alarms, which would automatically occur in the event of a defrost. For this reason a defrost recognition can be parameterised for every wireless sensor registered with the receiver module.

For the time period during which a wireless sensor registers a defrost:

- no temperature alarm is triggered;
- a defrost symbol is displayed in the 24h list
- the defrost status is set in the LDSWin graphic and
- a star (* = symbol for the defrost snowflake) is displayed in front of the temperature display,
  see menu 1-2 and menu 2

Defrost recognition can be parameterised via the parameter *Refrigeration Pnt* in the menu item 2-2-2 *Case cntrl*. The following settings are possible:

1. Defrost times directly from a case controller

Application: Optimal and automatic solution for wireless sensors integrated into the E*LDS system.

Parameter: *Case Contrl.: UA* (for case controllers of the E*LDS system)
  UA Nd. No:. (Can bus address of the case controller 1..99)

Function: Adoption of the defrost times directly from a UA 300 or UA 400 case controller. In addition, the CAN bus address, i.e. node number of the case controller in whose case the wireless sensor is positioned must be entered via the parameter *UA Nd. No* The precondition for this is that all participating components (receiver module, case controller, system centre or store computer) are connected with each other via the CAN bus). Furthermore, a number of wireless sensors can be assigned to the same case controller, as required for e.g. the temperature monitoring of several tiers in a refrigeration case.

2. Configuration of a defrost timer

Application: Optimal solution for third party systems with fixed defrost times for the cases to be monitored.

Parameter: *Case Contrl.: other*   (for case controllers of a third party system)
                  Defr.detct.: Timer   (defrost recognition for fixed defrost times)

Function: Via the parameter *Abt.erkennung: Uhr*, up to three defrost times can be specified (e.g. three defrosts per day). Furthermore, the maximum defrost time for the case must be entered via the parameter Dauer (equivalent to the safe defrost time) so that no failure alarms are triggered during a defrost.

☞   If the fixed defrost times in the cases to be monitored are changed,
           then the defrost times configured here must adjusted accordingly.

3. Automatic defrost recognition

Application: In the event that the wireless sensor is positioned in a case which is not controlled by either a UA 300 or UA 400 case controller or equipped with a fixed defrost time, then defrosts can be automatically recognised within a certain framework.

Parameter: *Case Contrl.: other*   (for case controllers of a third party system)
                  Defr.detct.: autom.   (automatic defrost recognition)

Function: The intelligent defrost recognition can automatically recognise defrosts via the temperature difference, i.e. the temperature increase, and thus minimise high temperature alarms.
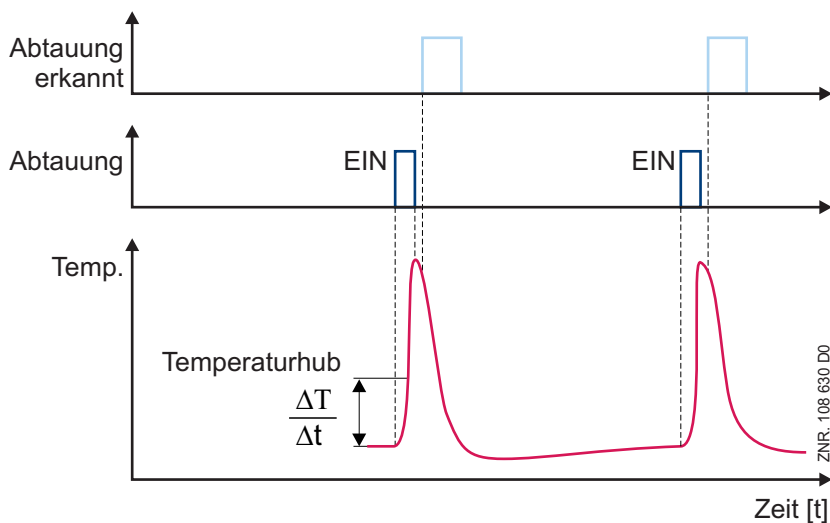
Only at that point in time when the temperature begins to fall again does the receiver module assume that a defrost has taken place.

☞   The defrost recognition is triggered when the temperature initially differs from the current average
           temperature by a specific value (temperature difference) and begins to significantly fall again before
           the end of the high temperature alarm delay:

The parameter *Defr.type* is available for the fine adjustment of the automatic defrost recognition. The difference between the defrost types is to be found in the pre-configured temperature difference. With circulating air defrost the automatic defrost recognition reacts more sensitively as the temperature rises in the case are generally less strong or sharp compared to electric, i.e. hot gas or D2D defrosting. With the last defrost type the automatic defrost recognition only reacts to larger temperature jumps.

Possible settings for the parameter Abtautyp are:

off-cycle   Circulating air defrost

el/HG/D2D: Electric, i.e. hot gas or D2D defrosting

unknown: The type of defrosting is unknown or the parameter for the automatic defrost recognition is to be altered manually. In this case the parameter TmpDiff is to be used for setting the value for the temperature difference, which can be set manually to a value from 0.5 K to 5.0 K: If this value is small, then the start of a defrost phase is "recognised" even in the event of a small temperature jump. The larger the value then the more tolerant the defrost recognition is to deviations.

Example:
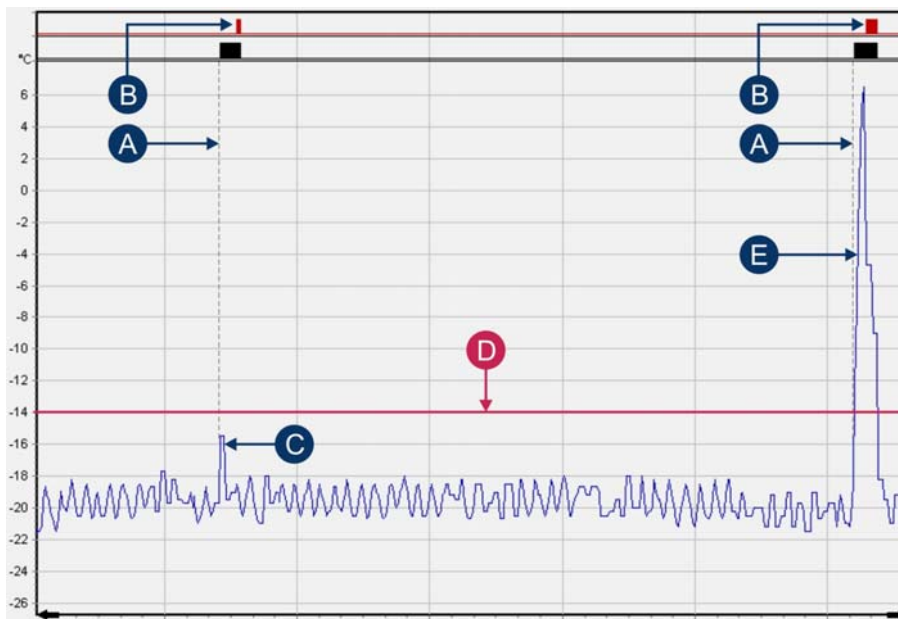
(A):   Defrost recognition started
(B):   Defrost recognised
(C):   The temperature difference for the defrost recognition has been set too low.
        Consequence: This small temperature difference has been falsely recognised
        as a defrost.
(D):   Alarm limit
(E):   This example shows what an actual case defrost looks like.
        The temperature difference can be set to be less sensitive (set to a higher value).

When using the automatic defrost recognition the transmission interval should be set to a maximum of 15 minutes. Furthermore, in this operating mode, the delay counter for the high temperature alarm continues to run, even when a defrost has been recognised. However, as long as a defrost is recognised (B), no alarm is triggered.

Alarm signals with automatic defrost recognition

As long as a defrost is recognised (B) and the temperature continues to fall, no alarm signal is generated.
The defrost status is reset when:
- the temperature is below the alarm limit (D)
- the temperature rises again or
- the defrost status continues for a longer period than the set alarm delay time.

5   Installation and Startup of WR 300 / WR 400 / TS 30 W

5.1   Basics of radio technology

When deploying radio technology a series of basic guideline s must be observed during the planning phase, the installation and positioning of the receiver module and the corresponding wireless sensors TS 30 W. The following instructions are addressed to

- Project managers / planners   (e.g. in order to establish the transmission path)
- Technicians / installers   (e.g. for installation and commissioning)
- Service technicians   (e.g. for the identification and rectification of faults)

and provide important guidelines for the layout, handling and optimisation of the radio technology in order to guarantee reliable operation.

5.1.1   Signal damping through reflection and transmission

Radio signals consist of electromagnetic waves whose electrical field strength (E) as well as magnetic field strength (H) decline in inverse proportion to the square of the distance (r2) between the transmitter and the receiver.
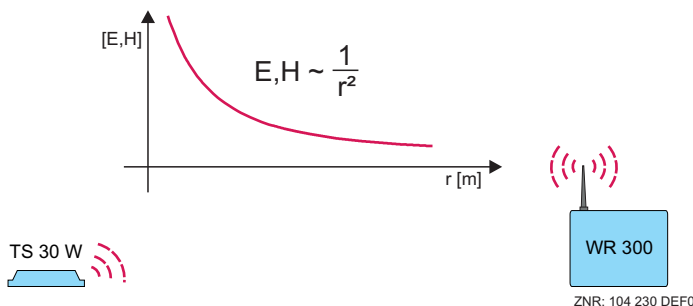
If the field strength is allowed to propagate unhindered

☞   The further away the sensor is placed from the receiver module then
             the higher the signal damping and therefore the poorer the reception!

Interference sources that dampen the radio signal

In addition to distance there are further factors that restrict the range of radio signals and interfere with radio transmission:

- Metal parts e.g. rear panels of refrigerated display cases or their shelves, steel furniture
- Iron and steel reinforcement in walls
- Dry walls with metal foil from heat insulation material
- Metal vapour coated heat protection glass from freezers
- Metallic coldrooms and cold-storage cells etc.

These conditions contribute to the reflection of electromagnetic waves and the formation of a "radio shadow" at their rear, severely restricting the transmission of radio signals.

Electromagnetic waves can penetrate a range of different materials. However, this results in a higher signal damping compared to unhindered propagation.
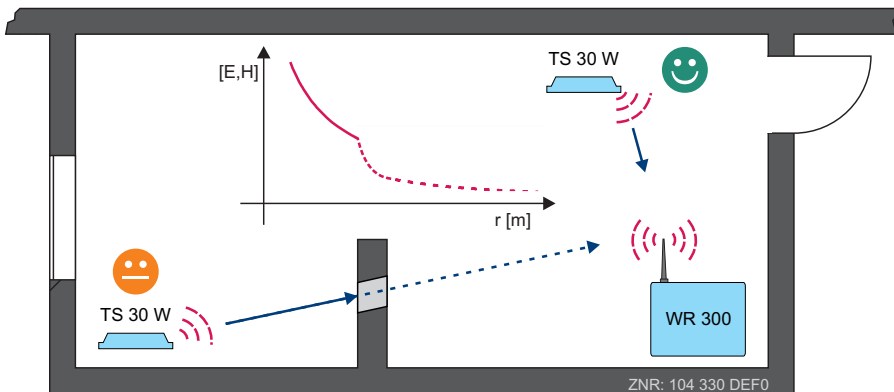
The local conditions as well as the construction materials employed in the building are a significant factor in assessing the radio transmission range and should be accounted for when positioning wireless sensors. The following table indicates the characteristics of different materials and their effect on the signal damping:

Building material	Damping	Example
Air	None	Open air, factory building, courtyard
HolzWood	Low	Doors, floor, partition walls
Plastic		Thin partition walls, food packaging with cellophane foil
Glass, uncoated		Untinted glass
Glass, tinted	Medium	Tinted glass
Stone		Masonry, brick, press board
Plaster		Partition walls
Water		Heavy rain
Intermediate ceilings		Suspended ceilings
Ceramic	Strong	Tiles
Paper		Paper rolls
Steel reinforced concrete		Supporting walls, floor levels, columns
Reinforced glass		Bullet-proof glass
Liquids		Water
Metal		Steel reinforced concrete, mirrors, metal cabinets, lift shafts, aluminium coated surfaces e.g. refrigerated display case blinds, metal vapour coated glass (radiant panel heating)

Guideline values for assessing the transmission path between the receiver module and wireless sensors:

- Unhindered
ca. 80 m range (in factory buildings)
ca. 40 m range (in corridors)

- Plaster board walls, wood: ca. 25 m range (approx 4 walls)

- Brick walls, aerated concrete: ca. 15 m range (approx 2 walls)

- Steel reinforced walls/ceilings: ca. 10 m range (max 1 wall/ceiling)
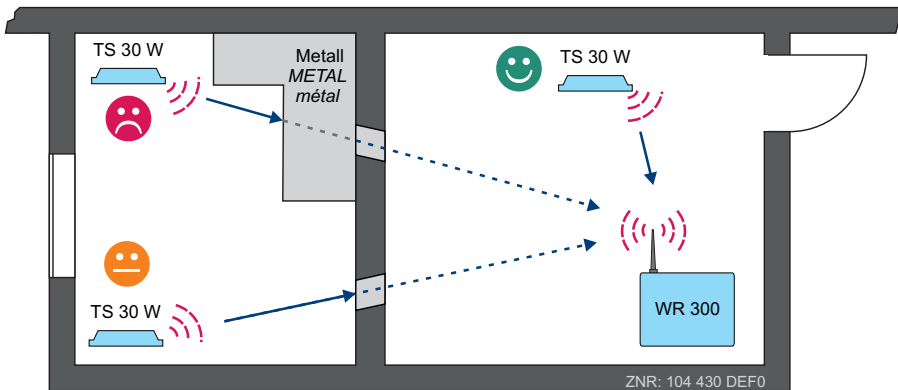
Blocking and damping of radio waves

Praxis tip: Supply and lift shafts, fire protection doors and walls, staircases and cold-storage cells should be considered as radio signal barriers.

In addition to distance and the material characteristics of the local environment, the angle at which the radio signal strikes a wall also has a significant influence on signal quality. Signal damping is increased when the signal strikes the wall at an oblique angle, a result of an effective increase in the wall thickness:
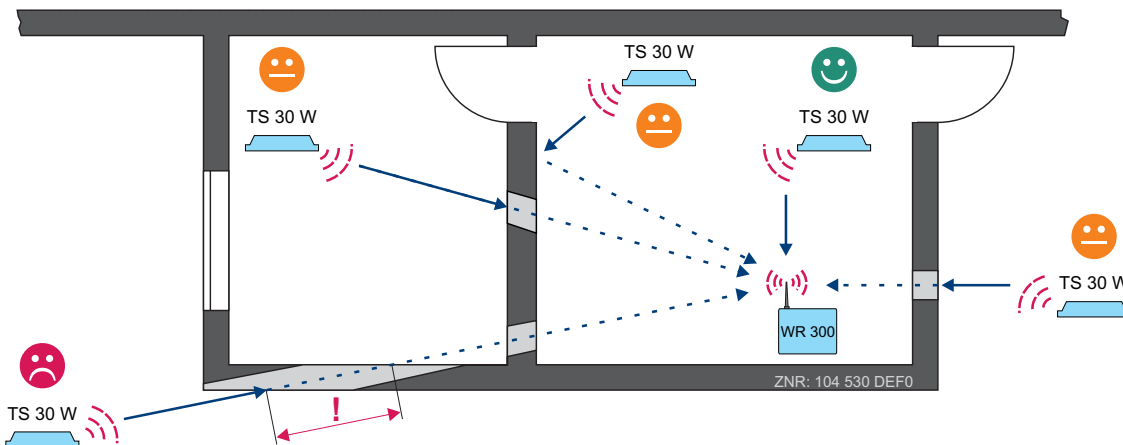
Praxis tip: If possible, the sensor's radio signal should strike the masonry at a right angle on its path to the receiver module! By changing the position of the receiver module, i.e. the wireless sensors, reception quality can be improved.

ECKELMANN

Further sources of interference

Devices which generate high frequency signals such as PCs, WLAN, switched-mode power supplies, control gear or audio/video equipment should be considered as further sources of interference as they can lead to an additional deterioration in transmission quality.

min. > 0,50 m

ZNR: 104 630 DEF0
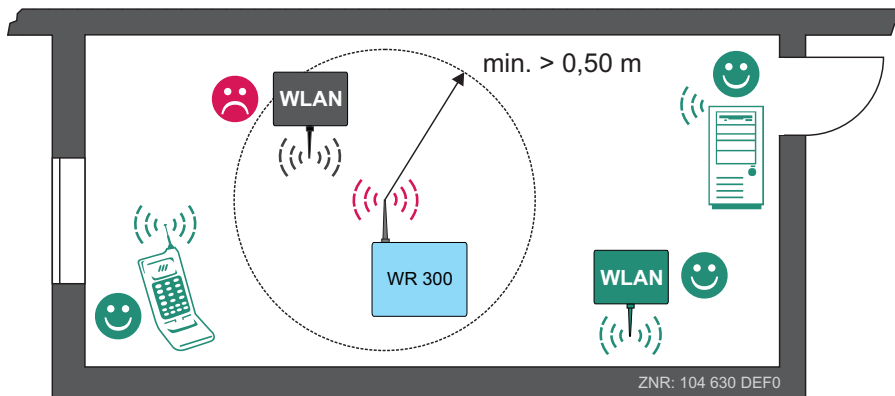
☞ **Praxis tip:** The receiver module should be placed **at least** 0.5 m from devices which generate high frequency signals.

5.1.2 Positioning of the antenna

In order to react flexibly to local conditions, i.e. to improve the reception quality of the receiver module (A) through an optimal positioning of the receiver antenna, it can be fitted with an optional external receiver antenna (B), and depending on the local conditions, an extension cable:

(A)   (B)

WR 300   WR 300

ZNR: 104 730 DEF0
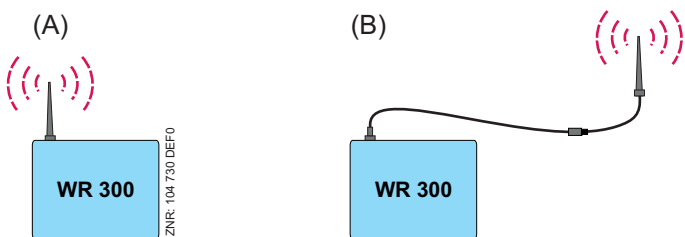
☞ An extension to the antenna cable increases flexibility in finding an optimal position for the receiver module, however every additional antenna connection or increase in the length of the antenna cable also increases the signal damping, which in turn leads to a weakening of the reception signal!

Damping due to the antenna extension cable: 4.5 db / 5m
(type RG174A/U, article number ANT868VER1)

ECKELMANN

5.1.3 Guidelines for the positioning of receiver module and wireless sensor

In order to achieve good reception the receiver module's antenna should be positioned at a central, exposed location in the room.
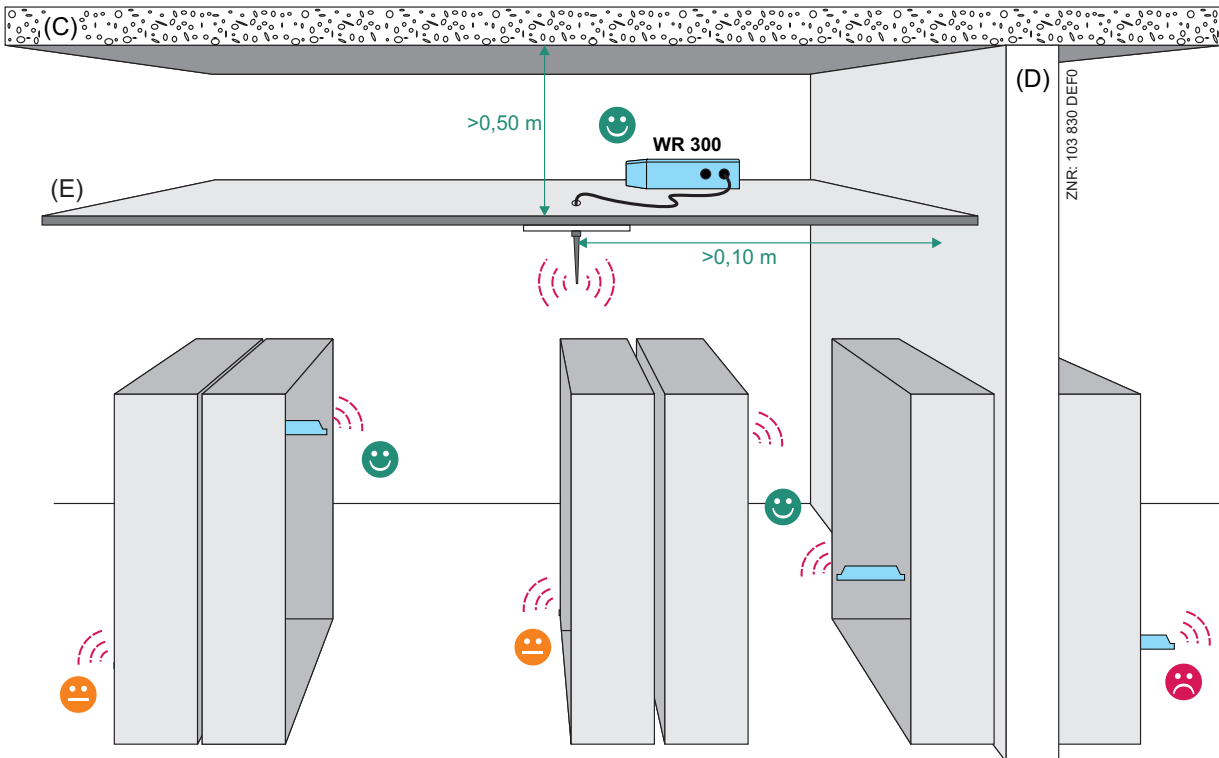
☞ **Praxis tip:** If possible, the antenna should be positioned so that it has an unobstructed view of the individual wireless sensors.

For optimal reception the antenna should be positioned at least 0.50 m from the ceiling (C) and 0.10 m from the wall (D). If an intermediate ceiling (E) has been installed the antenna should always
be placed in the room and positioned so it points towards the sensors.
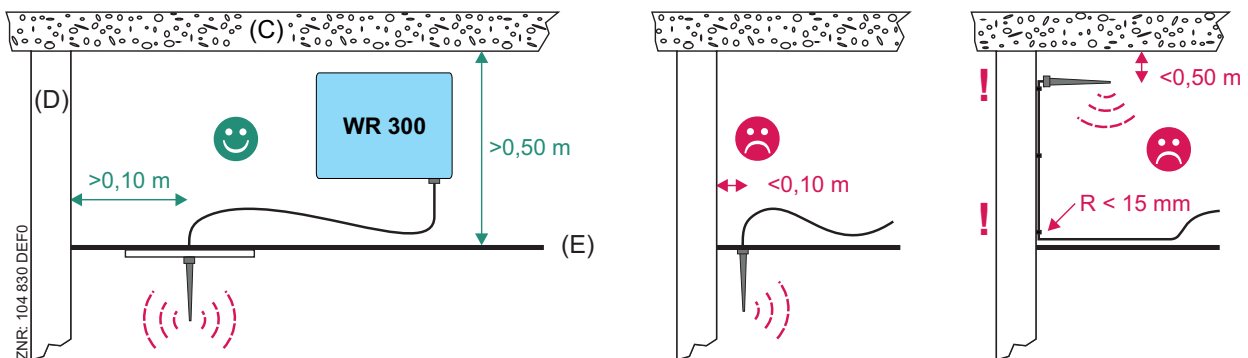
☞ When laying the antenna cable (type RG174A-U) ensure that it is **not** kinked.
A bend radius of **at least** 15 mm is to be observed.
Praxis tip: In order to generate a sufficiently large antipole to the dipole antenna, the antenna should be mounted on a metal ferromagnetic plate at least 200 x 200 mm in size. Due to the polarisation of the antenna it must **always be aligned perpendicularly**, either upwards or downwards.

Furthermore, it should be noted that the wireless sensors' preferred direction for transmitting and receiving is in the form of a half-sphere. The main preferred direction is indicated by the arrow stamped into the top of the casing:
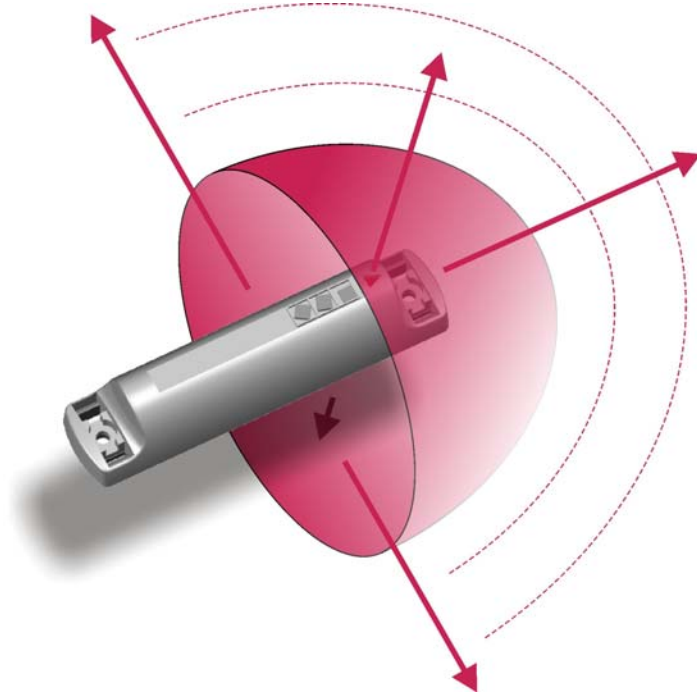
☞ For optimal radio transmission the arrow **should** always point in the direction of the receiver module.
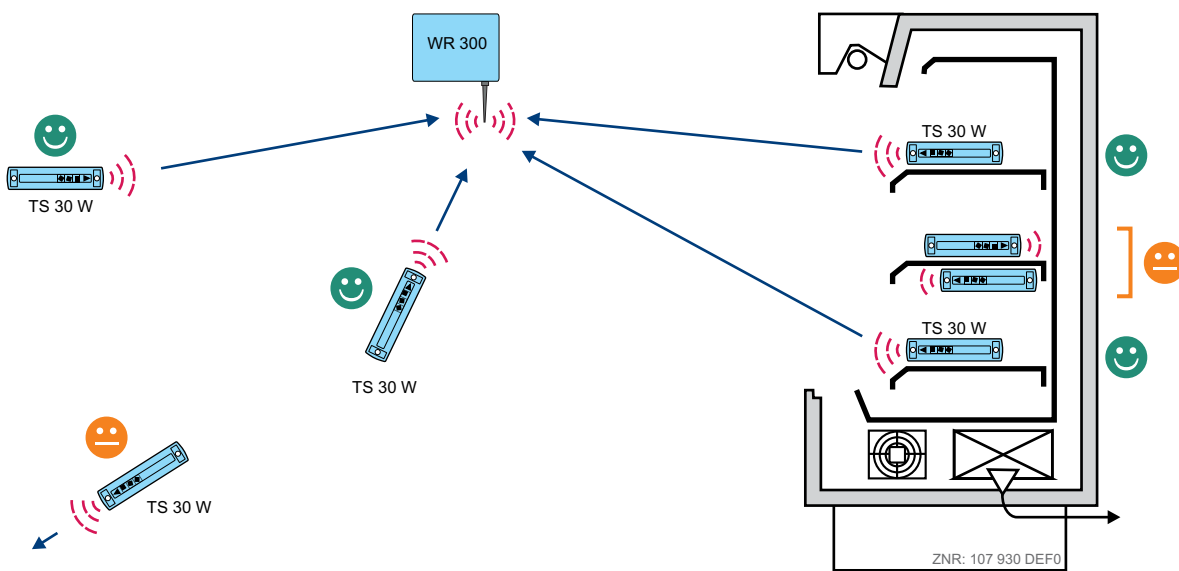
☞ **Ideal:** A direct line of sight to the receiver module.
Unfavourable: Intermediate shelves / walls are to be avoided.

Minimisation of scattering and reflection

Receiver module and wireless sensors should not be positioned on the same side of a wall as radio waves in the vicinity of walls are subject to interference from scattering, i.e. reflection:

ZNR: 104 930 DEF0
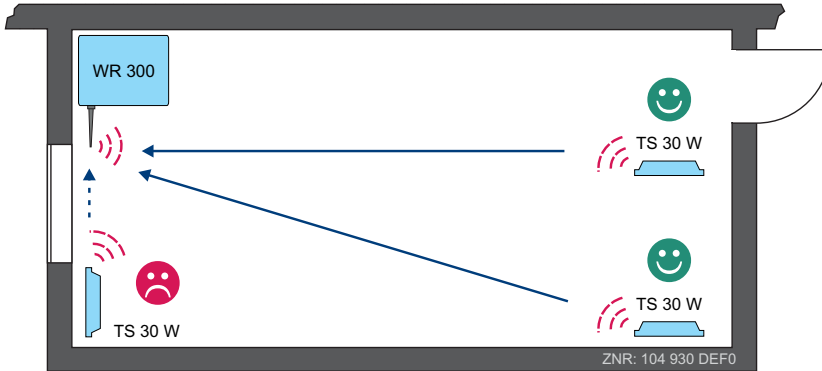
👉 **Praxis tip:** Ideal installation sites are opposite wall or adjoining wall surfaces.

Improving the reception quality

In order to improve reception quality the use of a second receiver module should be considered (A), or the use of a wireless sensor of the type TS 30 XW with external sensor (B) or changing the position of the receiver antenna (C).

ZNR: 103 930 DEF0
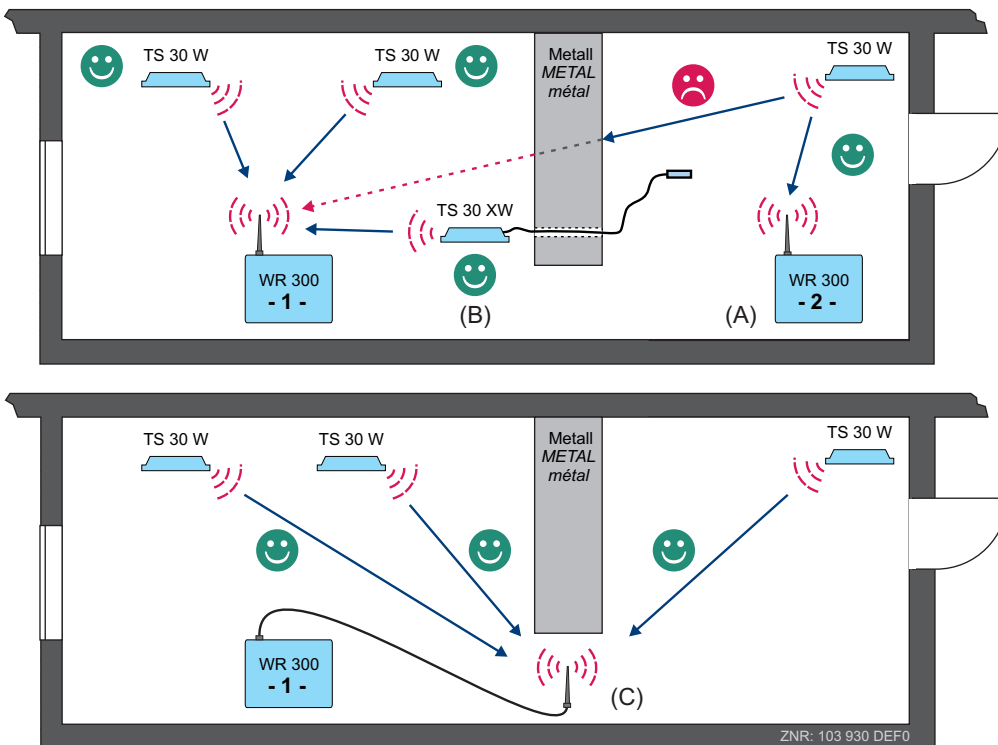
👉 During initial planning the option of retrofitting an additional receiver module should be accommodated (e.g. providing additional clamping points for connecting to the CAN bus).

ECKELMANN

5.2 Commissioning

⚠ **Important safety instructions!**
BEFORE the installation and commissioning of the receiver module, chapter 1
should be carefully read in its entirety and all safety instructions and hazard warnings observed.

5.2.1 Installation

⚡ **Warning - hazardous electrical voltage!**
Danger of electric shock! BEFORE opening the receiver module it must be ensured
that the device is off load!

Prior to installing the electrical connections or attaching to the wall, the casing cover is to be removed by unscrewing the 4 screws:
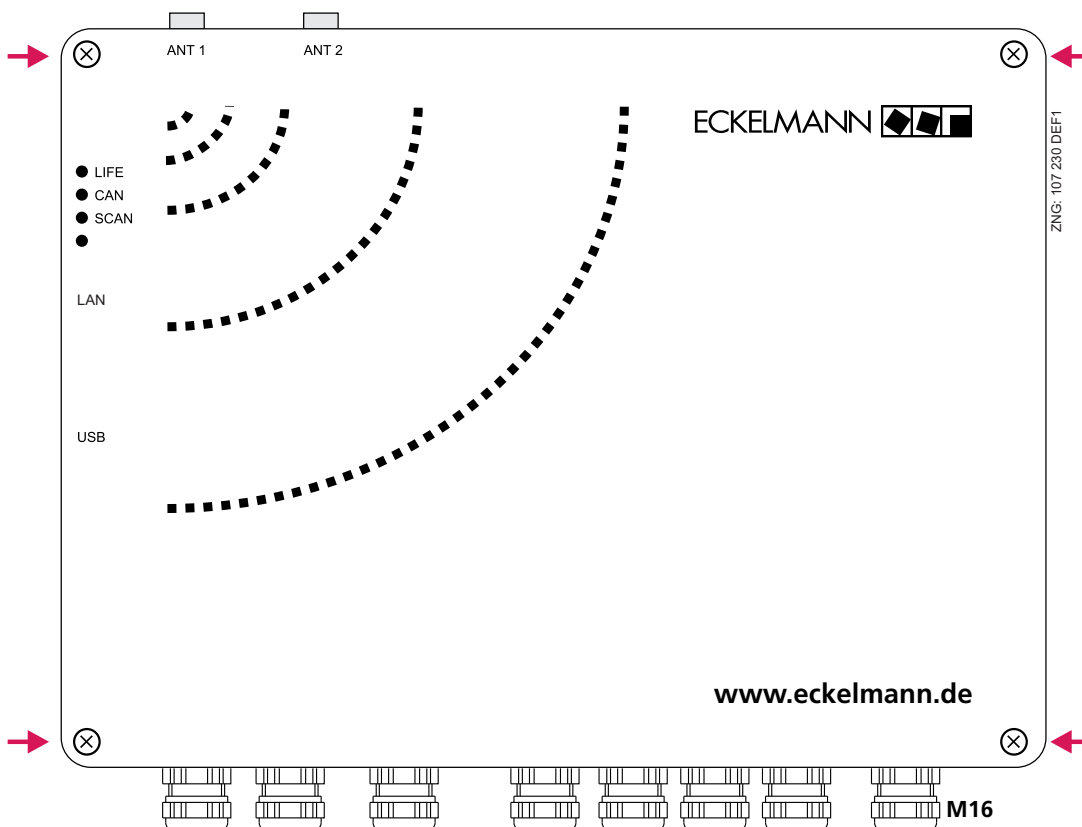
⚠ The receiver module may only be operated in heated or air conditioned rooms.

Following removal of the casing cover the receiver module can be attached to the wall using 4 screws
(Ø max. 4.2 mm).
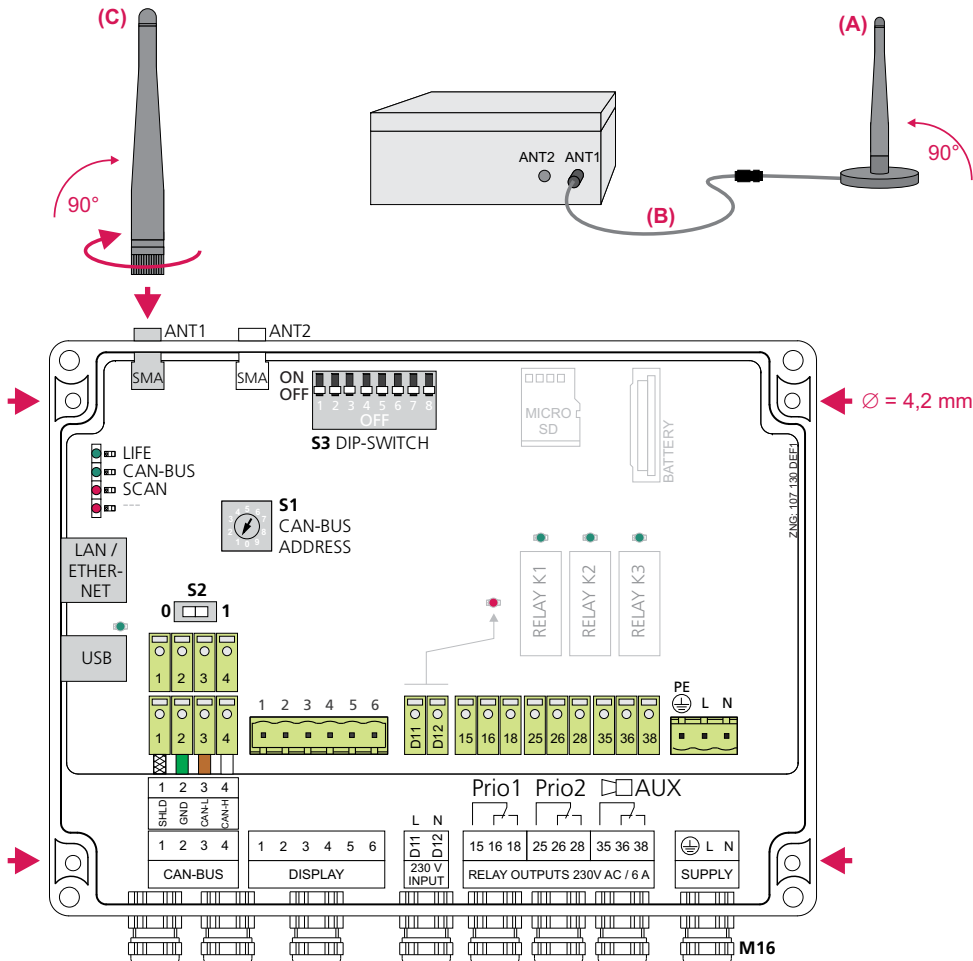
The external antenna (A), with or without optional extension (B), or the rod antenna (C) is lightly screwed into
the SMA socket ANT1.

Antennas may only be attached or removed when the receiver module is off load.
All cables from and to the receiver module - in particular the CAN bus - must be shielded (see hand-
book "Basics and General Safety and Connection Instructions"). As a general rule, care should be
taken to ensure that signal leads and leads carrying a supply voltage are routed through separate
cable channels.

As the desired installation site for the receiver module does not always correspond to the best recep-
tion site, the external antenna (A) is to be preferred to the rod antenna (C). This enables a quick,
simple and flexible location of the ideal reception position. For optimal reception the antenna **must**
always be installed perpendicular (90°), see chapter 5.1.2 / 5.1.3 - Positioning of the Antenna /
Guidelines for Positioning.

Degree of protection and precise dimensions of the receiver module are contained in the chapter
Technical Data.

5.2.2   Settings and connections

Following installation of the receiver module the following steps must be carried out:

Receiver module

• Setting of the DIP switch

• Settings and connection (CAN bus, voltage supply and status LEDs)

• Basic parameterisation of the receiver module

• Only WR 400 in stand-alone operation: for connection via LAN see chapter 5.3

Wireless sensor TS 30 W / TS 30 XW

•   Positioning and installation

• Rapid commissioning

• Activation

• Overview and status

5.2.3   Setting of DIP switch S3
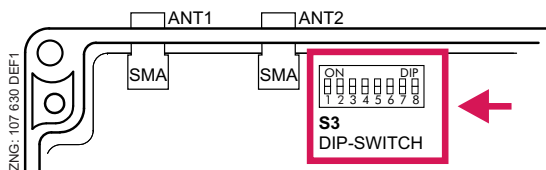
• **DIP switch S3 - coding switch 1 .. 8:**

At present all DIP switches are without a function.

DIP switch S3 coding switch 1 .. 8	Switch position	
	ON	--
	OFF	Normal operation - all DIP switches OFF

ECKELMANN

5.2.4   Setting the CAN Bus address

Before commissioning the individual CAN bus address, i.e. node No. (Node No.= 117..120) must be set on the receiver module's decade switch **S1**.
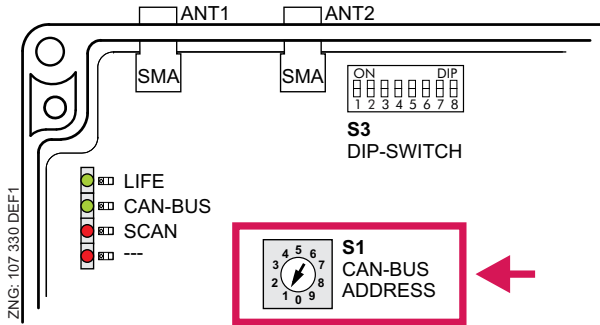
S1	CAN bus address (Node number) setting	Function
1..4	117..120	CAN bus address, i.e. node No. allocated
0, 5..9	0	CAN bus interface inactive (disabled): The receiver module is not recognised as a CAN bus participant!

☞ Every receiver module is allocated a different CAN bus address, which may **only occur once** in this system.
Important: It is possible that the potential CAN bus addresses 117..120 have already been allocated within the system to the operator terminal AL 300! In order for receiver modules to be integrated into the system this operator terminal must be allocated an address in the range from 112..116 (for details see the AL 300 operating instruction).

The receiver module only accepts the setting at the decade switch **S1** after it has been briefly powered down!

ECKELMANN

5.2.4.1 Connection to the CAN bus

The receiver module is equipped with two terminal blocks for connection to the CAN bus (terminals 1..4). These terminal blocks are connected to each other electrically, consequently, it makes no difference which of the terminal blocks are used to connect the CAN bus.

☞ The cable type LIYCY 2x2x0.75 mm^2 (cores stranded in pairs) must be used for the CAN bus.

Furthermore, the terminal block is equipped with an integrated terminating resistor (100 Ohm) for the termination of the CAN bus.

Switch position S2 = 0 (factory setting)

Should always be selected when the receiver module is **not installed at the start/end** of the CAN bus (CAN bus cable is through-routed to the next E*LDS component):
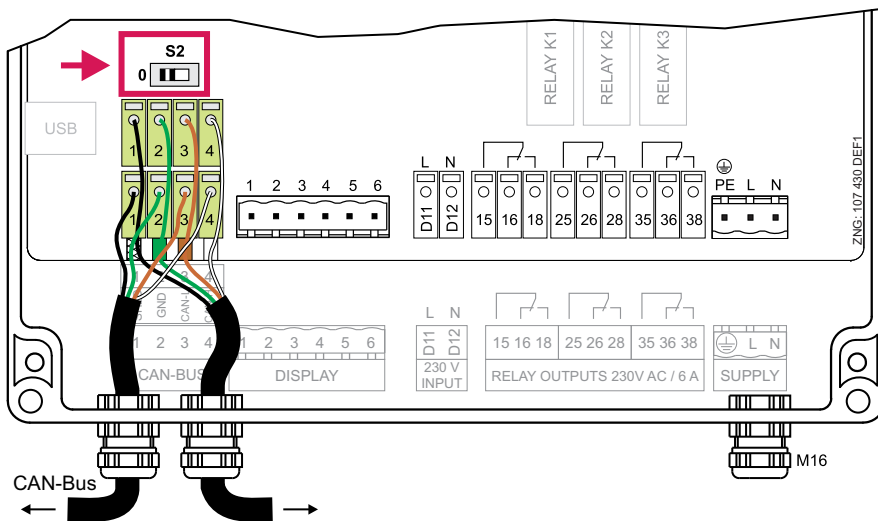
Switch position S2 = 1

Terminating resistor must always be activated when the receiver module is installed **at the start/end** of the CAN bus (CAN bus cable begins/ends here):
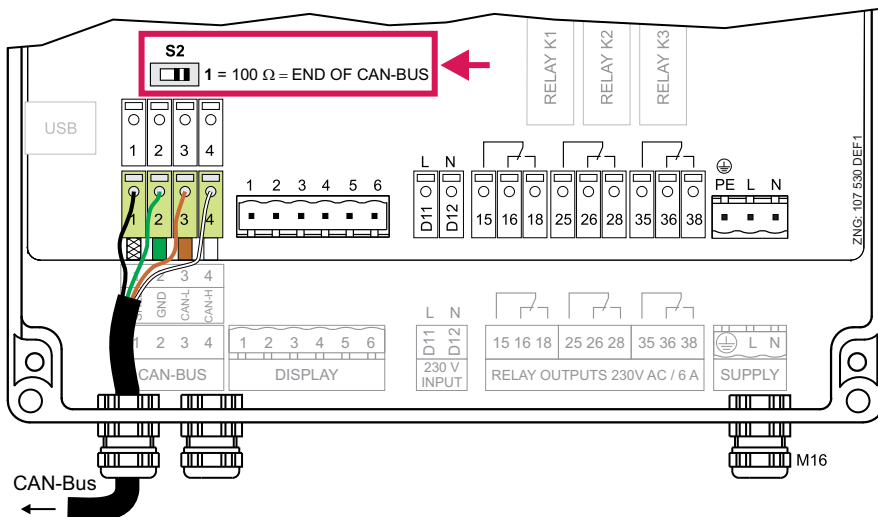
5.2.5 Power supply

⚠️ **Warning - hazardous electrical voltage!**
Danger of electric shock! BEFORE connection it must checked that the 230 V AC power supply cable is **off load!**

The power supply cable is connected to the receiver module using the right hand terminal block PE/L/N.
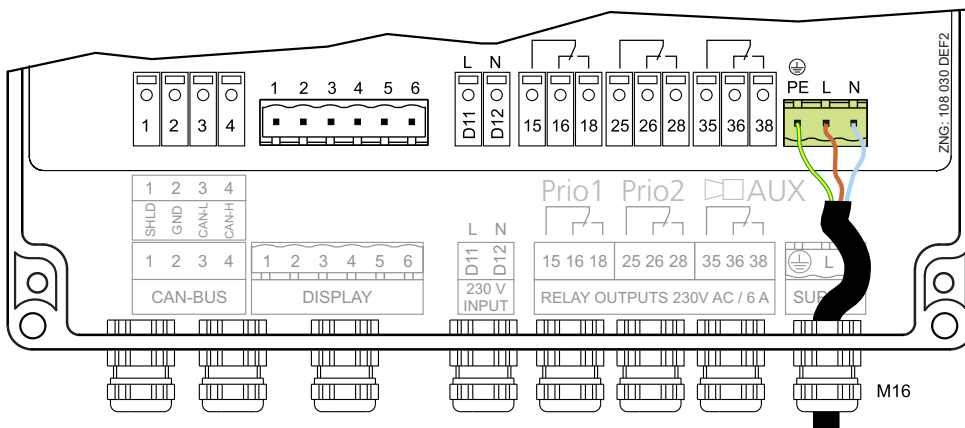
The receiver module can now be supplied with power. If power is being received the active lamp (LIFE LED) flashes for approximately 10 seconds following actuation. If the receiver module is also connected to the CAN bus, then the CAN bus LED flashes. For more details on the status LEDs see chapter 5.2.5.1.

5.2.5.1 Status LEDs
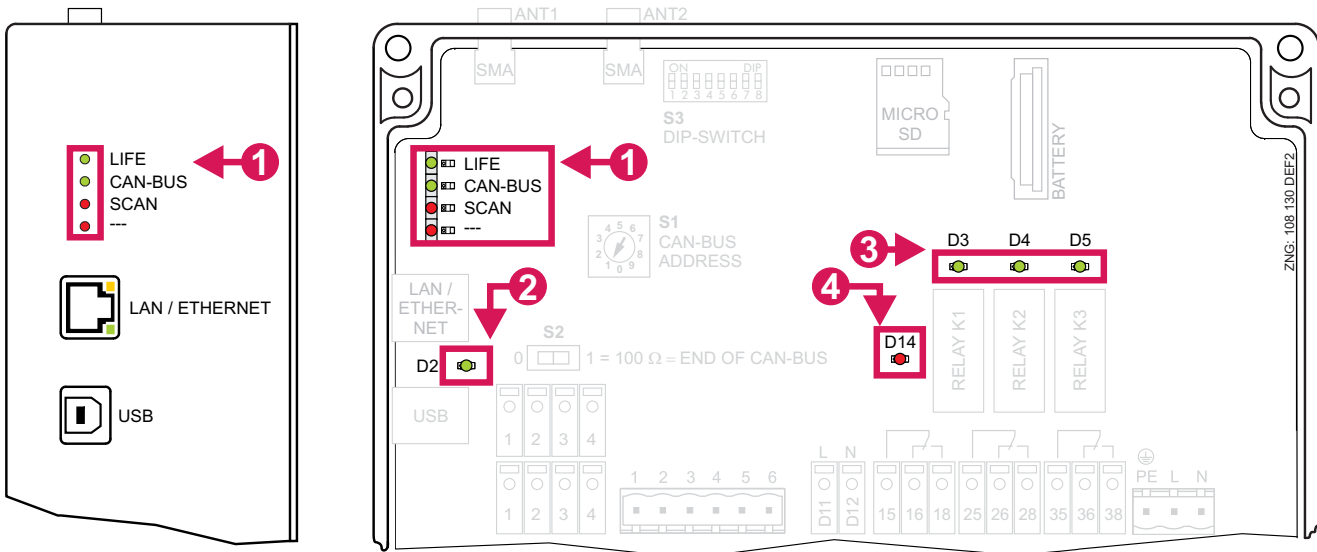
	LED	Colour	Function
1	LIFE	green	Flashing: Receiver module is supplied with power Off: Power supply interrupted or device defect
	CAN BUS		Flashing: LED always flashes when data is being exchanged with the system centre store computer via CAN bus Off: Connection to the CAN bus interrupted or device defect
	SCAN	red	Flashing: Searching for wireless sensors, when a: - Search mode activated (menu 5-1) b: - Wireless sensor registered with the receiver module does not signal
	--		Reserve
2*	D2	green	USB LED ON: Connected to the PC OFF: Not connected to the PC
3	D3		ON Relay K1 (terminals 15/16/18) is switched
	D4		ON Relay K2 (terminals 25/26/28) is switched
	D5		**ON Relay K3 (terminals 35/36/38) is switched**
4*	D14	red	ON Digital input is active **WARNING: Terminals D11/D12 can carry an external voltage!**

* Currently without a function!

5.2.6 First start

Following a firmware update a cold start may occur. During this procedure all parameters are returned to the factory settings, i.e. all individual settings in the receiver module are lost!

For further details on firmware updates, i.e. the backup of settings, see chapter 5.5.

ECKELMANN

5.2.7 Installation of TS 30 W

👉 During the positioning of wireless sensors the guidelines for the positioning of receiver module and wireless sensor (see chapter 5.1.3) must be observed. The wireless sensors should now to be placed in their intended positions!

The following mounting options are available for the installation of the wireless sensors:
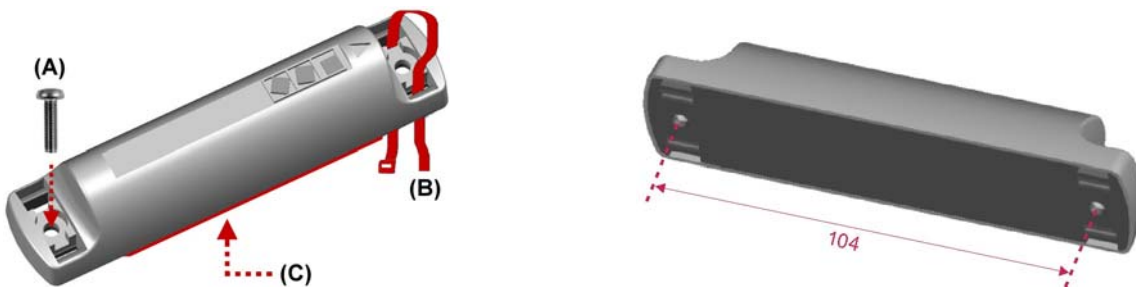
A: Screw mounting

Drill holes (Ø = 4.2 mm) for two cylinder head screws (min. 15 mm) are provided for mounting.
The centre to centre distance between the two holes is 104 mm.

B: Cable ties mounting

Two slits (8 x 3 mm) are provided on each side for cable ties mounting.

C: Mounting using double-sided tape

👉 The surfaces intended for the application of the double-sided tape (bottom surface of the wireless sensor / shelf) must be free from grease and dust and warmer than + 10 °C during mounting.

1. Attach one side of the double-sided tape to the intended surface of the wireless sensor (max. attachment area: 25 x 95 mm^2) and press firmly.

2. Remove the second protective foil from the sticky tape and press the wireless sensor firmly in place in the intended position.

Praxis tip: For an attractive appearance, the two supplied facings can be attached following mounting:

ECKELMANN

5.2.8   Basic parameterisation

☞ WR 400 only: Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

The following steps 1 to 3 are only required for operation via the CAN bus. In the event of operation via a local operator interface (BT 300) please start with point 4.

1.   Deactivate the input lock
(operation via system centre, store computer, i.e. the operator terminal is only possible with receiver modules with CAN bus connection):

In the main menu:

- select 9 parameterisation - 3 **Interlock,**

- by pressing the **return button** (↵) set the **marker** (√). The lock has now been deactivated and it is now possible to make settings.

- Exit the control screen and return to the main menu by pressing the **Esc button** twice.

☞ The lock is automatically reactivated 10 minutes after the last keystroke and the switching on of the operator terminal.

⚠️ For the operation of the receiver module the following conditions must be met
- The system centre to be fitted with the firmware ≥ V6.2.0
- The store computer to be fitted with the firmware ≥ V5.12 and
- The operator terminal with the firmware ≥ V5.06 (see menu 8-3) and
- The LDSWin PC software in a version ≥ 2.4.3.4056.

2.   In the main menu of the system centre / store computer, i.e. the operator terminal select **5 Remote Control**.

3.   Select the desired receiver module:

Select the receiver module with the corresponding CAN bus address (node No. = 117..120) from the list using the cursor or by direct entry and confirm with the **return button** (↵). The main menu of the receive module appears.

☞ If the main menu of the receiver module does not appear, check whether
1. the version of the store computer is ≥ V5.12,
2. the CAN bus address of the receiver module is set correctly (see chapter 5.2.4),
3. the receiver module is receiving power and is connected to the CAN bus
   (check status via the CAN LED).

4.   Receiver module configuration menu
Menu item 6-1:   Enter the name of the receiver, position and priority
                   Only WR 400 in network:
                   Setting the IP address of the receiver module, see chapter 5.3.1
Menu item 6-3:   Set the alarm priorities for the receiver module

☞ As a rule these two screens do not need to be changed
as they already contain factory settings.

5.   The next step is to activate the search mode, see chapter 5.2.9.

5.2.9 Quick commissioning of the sensors

WR 400 only: Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

During quick commissioning the receiver module automatically searches for all sensors within range, entering all the sensors it finds in its sensor list.

The sensor list is divided into enabled sensors (menu item 2) and non enabled sensors (menu item 5-2). Enabling the sensor allocates the receiver to the wireless sensor for the purpose of monitoring and data recording.

Before a search is started it is possible to define whether all the sensors detected are to be automatically enabled by the receiver module. This is selected via the parameter *Auto Enable* (menu item 5-3).

This setting is recommended when only one receiver module is used
- falsely enabled sensors can be deleted again via menu item 2-5.

If the parameter *Auto Enable* is set to ON
all the sensors detected by the receiver immediately appear in menu item 2 and commence data transmission.

If the parameter *Auto Enable* is set to OFF,
every sensor detected must be enabled manually via the menu item 5-2.
After the search has been started via menu item 5-1 the sensors must be activated (see chapter 5.2.10).

If more than one receiver is used care must be taken that each sensor is only allocated to one receiver. (see also chapter 5.2.13).

Summary of rapid commissioning:

1. Configure the Auto Enable parameter as desired   (menu item 5-3)
2. Start search   (menu item 5-1)
3. Activate sensors   (see chapter 5.2.10)
4. Check whether all sensors have been found   (menu item 1-2 or 2 for enabled sensors)
   i.e. enable the desired sensors   (menu item 5-2)
5. Terminate the search!   (menu item 5-1)

During automatic registration with the system, each sensor is allocated an identification number (ID) between 1 and 100 which is used to address the sensor from the receiver module, i.e. LDSWin menu. The identification of the individual wireless sensors is carried out, in the first instance, via the unique serial number which is clearly located on the side of the sensor casing:

- Serial number -

ECKELMANN

As a rule, during automatic registration the receiver module allocates the **last two** digits of the serial number as ID, unique names should be allocated for the sensor's name and position indicator.

Serial number (see label)		ID	Positions- indicator (menu 5-2-a)	Name / function / installation site (menu 5-2-a**)**
900241		41	Cheese1	Cheese counter 1
900243		43	Ice cream02	Ice cream freezer LT02
900018		18	M_TK	Meat LT
...		..	...	...

☞ New sensors can also entered into the system manually via menu item 5-2-a using their serial number, name and position indicator.
Praxis tips:
- The configuration of the sensor parameters is best carried out using the LDSWin PC software.
- For improved identification of the sensors the last two digits of the serial number should also be used during manual allocation.
- For an optimal overview it is recommended that a list of all the sensors in the wireless network be kept, recording their serial number, ID, position indicators and installation site.
A template for this sensor list is provided in chapter 11.5.

5.2.10   Activation of sensors

After the sensors have been placed in their intended positions, they must be activated ("woken up") before initial contact can be made.

Activation procedure:

The integrated reed contact required for activation is located in a central position beneath the upper surface of the casing inside the wireless sensor (1). In order to activate the sensor simply hold or stroke the activation magnet - WAKE ME UP - over the reed contact zone (2).
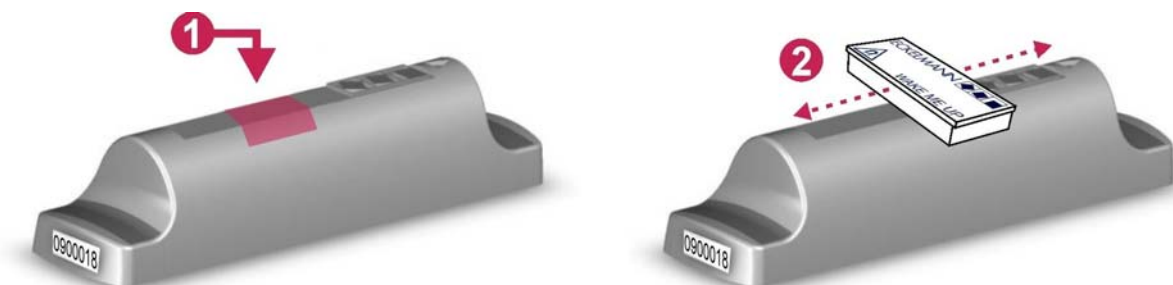
⚠ Please note that magnetic fields can erase data carriers and can destroy or influence mechanical components such as **heart pacemakers**, credit cards or video cassettes. The safety distances specified by the manufacturers of these products must be observed. Negative effects on humans resulting from magnetic fields generated by permanent magnets are unknown to us - in case of doubt, extreme caution is recommended.

☞ **Recommendation:** Store / deposit magnets at a central location, e.g. at the cabinet.
If the original magnet is no longer available a strong pinboard magnet with axial magnetisation can be used for activation.

Praxis tip: In order to reduce the waiting time during commissioning the wireless sensor can be activated at any time using the - WAKE ME UP - magnet, so that it immediately attempts to connect to the receiver module.

5.2.11 Overview and status of the sensors

The following menu items are available for an overview of all the sensors and their status:

• **Menu 1-1:** **Overview of all the sensors allocated to the receiver module**

Initially, all the sensors have the status *Registration*. If the receiver module establishes contact with one of the sensors, then the sensor receives the status *Active*.

If the sensor has not been found by the receiver module within a certain time period following switching on (factory setting 15 minutes), then it adopts the status *Offline*.

• **Menu 1-2:** **Status of the sensors (including temperature, operating status, signal strength)**

This screen displays the sensor's current actual values (including name, temperature, operating status, signal strength). For detailed information see chapter 8.1.2.

• **Menu 1-3:** **Sensors where there is currently no radio contact**

Here all the sensors are listed where there is currently no radio contact (all those sensors listed in menu item 1-1 as failed). The position of these sensors should be examined, and if required, corrected in accordance with the basics of radio technology (see chapter 5.1).

Following a change of position and after the wireless sensor has been reactivated using the - WAKE ME UP - magnet, (see chapter 5.2.10), it should be possible to receive a signal from the wireless sensor.

☞ WR 400 only: Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

5.2.12 Configuration of the sensor parameters

The following parameters should be entered for **every** sensor during commissioning:

• **Menu 2-2-3** - Alarm limits (high and low temperature)
- Alarm priorities
• **Menu 2-2-4** - Meaningful names and
- Position indicator

☞ WR 400 only: Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

5.2.13 Commissioning of a second receiver module

When using more than one receiver module it is important to ensure that each sensor is only allocated to one receiver module. Sensors located within the reception area of two receiver modules can present problems:

ZNG: 108 330 DEF
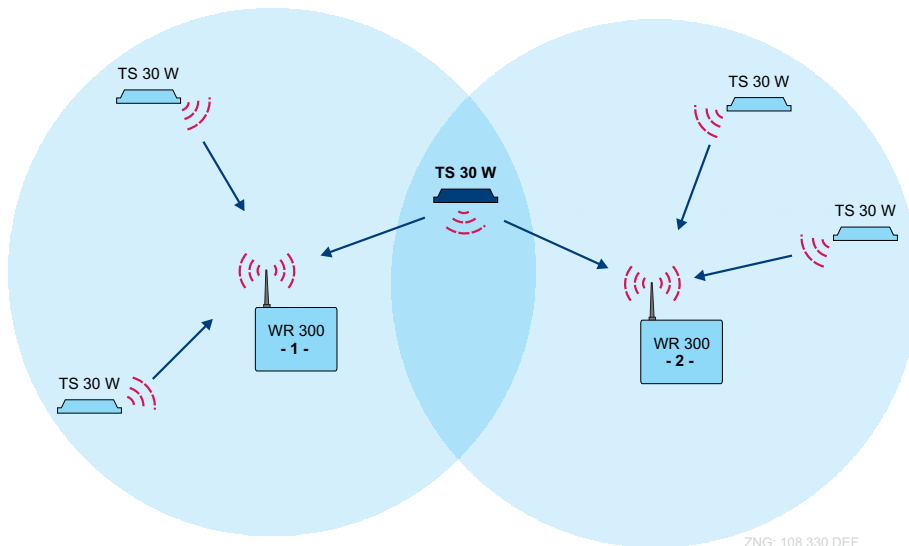
Problem: If the parameter *Auto Enable* is set to ON (menu 5-3) in both receiver modules, then, depending on reception, the one and then the other of the receiver modules can receive data from this sensor, leading to inconsistencies in its measured values.

Procedure for trouble-free commissioning:

For trouble-free commissioning the second receiver module should only be put into operation **after the first** receiver module has been successfully commissioned and all its corresponding sensors have been parameterised and integrated into this wireless network.

Step 1: First receiver module:

1. Menu 5-1:   Deactivate the parameter for the search mode

2. Menu 5-3:   Set the parameter *Auto Enable* to OFF

Step 2: Second receiver module:

The same steps are to be carried out as in the case of the first receiver module:

The same steps are to be carried out as in the case of the first receiver module:
Please work your way through chapters 5.2.1 to chapter 5.2.12. If the receiver module detects sensors which are already registered with an existing receiver module, then these sensors are to be deleted at **one** of the two receivers (menu 2-5).

When a wireless sensor is deleted (menu 2-2-5), or when its enabled status is withdrawn (menu 2-2-4), the data channel reserved for the sensor in the system centre / store computer is also deleted,
i.e. all data recorded is lost!

The same procedure is to be followed for the commissioning of further receiver modules.

5.3   Receiver Module LAN Connection - WR 400 only

For communication within a network, the receiver module needs an individual IP address, including the corresponding subnet mask. These details must be obtained from the administrator of the network **before commissioning** and configuring the receiver module as described in section 3.3.1. The receiver module may only be integrated in the network after this has been done.

A double or incorrect assignment of IP addresses and/or subnet masks can lead to the failure of components within a network. Consequently, in every case, the receiver module must be provided with an appropriate IP address before connection to the network.

WR 400 only: Detailed explanations of the operation and configuration of the receiver module, i.e. sensors, using a web browser are provided in chapter 7.4.

The following are described in more detail below:

- Setting the receiver module IP address

- Direct connection with a PC via a network

5.3.1   Network connection and setting of the IP address
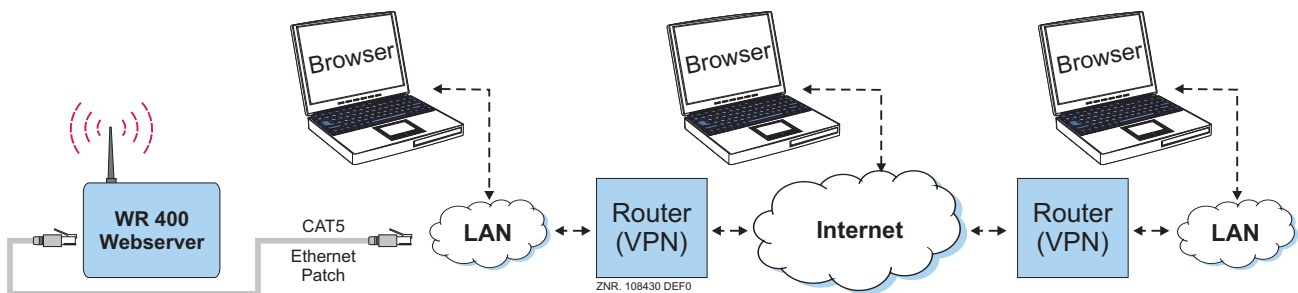
For a local connection between the receiver module and a PC,
an *Ethernet CAT5 crossover-patch cable* is needed. The network addresses to be set are to be obtained from the network administrator. If, despite having correctly set the network addresses, it is not possible to establish a connection then the web browser's proxy settings must be checked.

Factory side, the receiver module is configured with the following network address:

IP address: 192.168.161.2
Subnet mask   255.255.255.0

The correct IP address, subnet mask and possible also the Gateway address for the network is set via the menü 6-1. The IP address of the controls must be checked, here: 192.168.161.2, for example
The subnet mask is 255.255.0.0.

The IP address of the LAN Gateway and the PC must belong to the same subnet.

The Gateway address is not relevant in the event that there is no Gateway present in the subnet. It may then be a free subnet IP address (**though not "0.0.0.0"**).

ECKELMANN

5.3.2   PC direct connection via a network
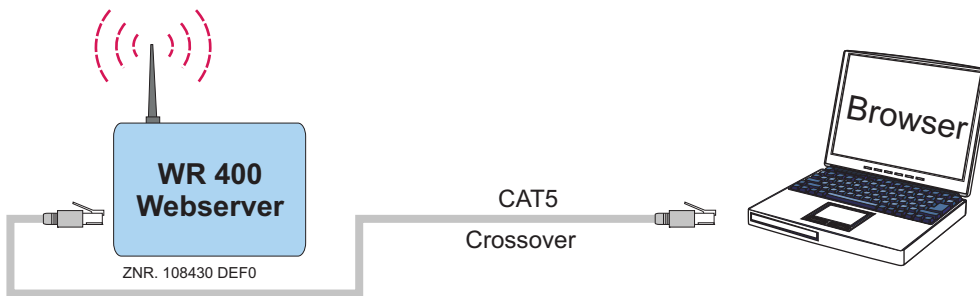
☞   A *CAT5 crossover-patch cable* is needed in order to make a direct connection between the receiver module and a PC network interface.

The PC and the LAN Gateway must be configured with IP addresses from the private IP address range.
The configuration described below is recommended:

Configuration of the PC

First, open the properties of the LAN connection concerned. In addition, click (with the right mouse button) on the desktop's network environment icon andselect properties.

The adjacent window will ap
Select the properties option for a LAN connection to the receiver module.

Make the settings for the TCP/IP protocol and have its properties displayed.
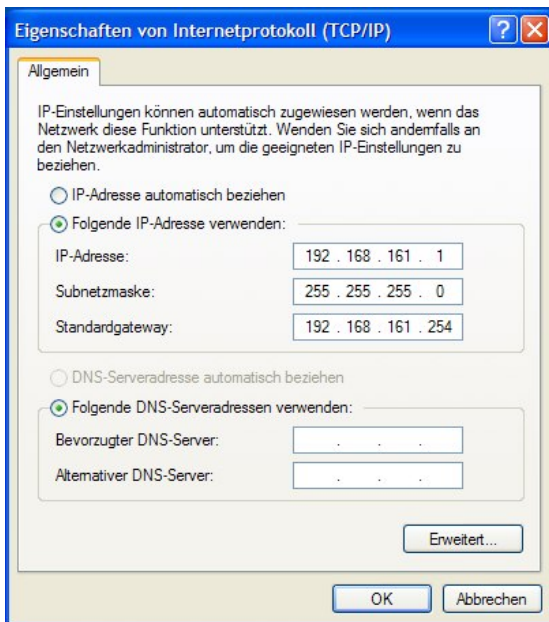
Make the following settings for the connection to the receiver module:

IP adress: 192.168.161.**1**
Subnet mask: 255.255.255.0
Standard gateway: 192.168.161.254

The DNS server need not be set.
Press **OK** to confirm.

Any IP address from the private IP address range can be used (e.g. 192.168.0.1 … 192.168.255.254). However, identical network areas and subnet masks may only be used for the receiver module and the PC. The network addresses to be set are to be obtained from the network administrator. If, despite having correctly set the network addresses, it is not possible to establish a connection then the web browser's proxy settings must be checked.

Configuration of the receiver module

As described in section 5.3.1, the following receiver module parameters must be configured:

IP adress: 192.168.161.**2**
Subnet mask   255.255.255.0
Gateway: 192.168.161.254

5.4 Maintenance and battery change

5.4.1 Receiver module - WR 400 only

For stand alone operation the receiver module is equipped with a buffer battery of the type CR 2450 N, 3V lithium. The receiver module must be off load when changing the battery.

In such an event, the corresponding wireless sensors are no longer monitored!

Therefore, in addition to the precautionary measures which directly effect the receiver module, effects on the higher level controller (e.g. Store Computer) connected to the CAN bus must also be considered.

Warning - hazardous electrical voltage!
Danger of electric shock! During a battery change the safety instructions in the chapter Safety and Connection Instructions are to be observed. All plug connections are only to be inserted or removed when **off load**. Circuit boards may only be exchanged when off load; always hold circuit boards at their edges.

ESD (electrostatic discharge) guidelines are to be observed;
see handbook Introduction General Safety and Connection Instructions!

Danger of failure of alarm messaging! In the case of connection via the CAN bus: The removal of the receiver module from the CAN bus generates an error message in the higher order controller (system centre / store computer). Care should be taken that the error message is acknowledged in good time or that the service centre is informed in advance.

Procedure for changing the battery:

1. **Turn off the power to the receiver module.** Acknowledge the alarm at the system centre / store computer.

Warning - hazardous electrical voltage!
Danger of electric shock! A number of plugs may be carrying a voltage of 230 V AC;
it is recommended to label plugs/cables before disconnecting.

2. Remove the receiver module from the retaining fixture.

3. Unscrew the four screws on the casing lid and remove the lid.
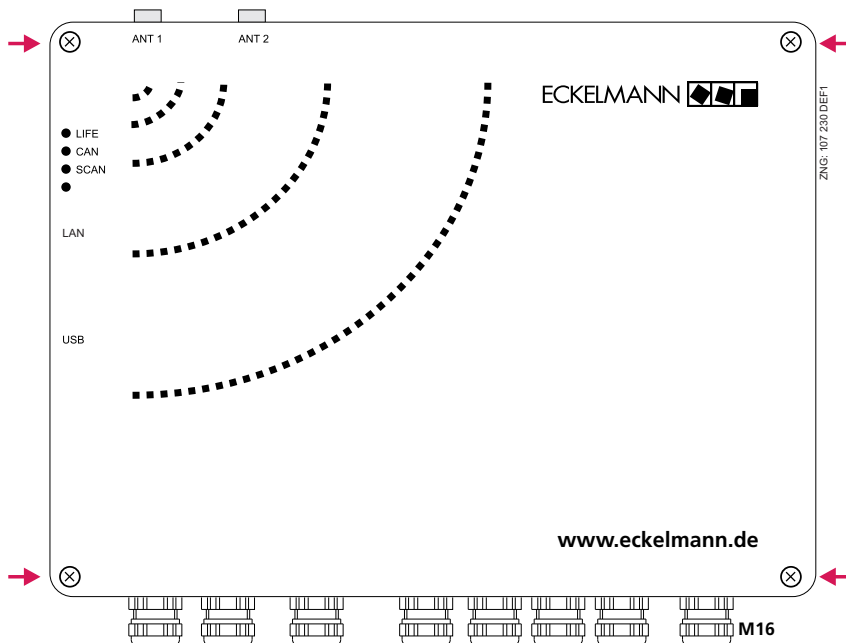
4. Unscrew the two screws on the plastic lid and remove.

5. Pull the battery upwards out of the battery holder and dispose of in a proper manner.
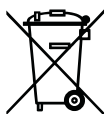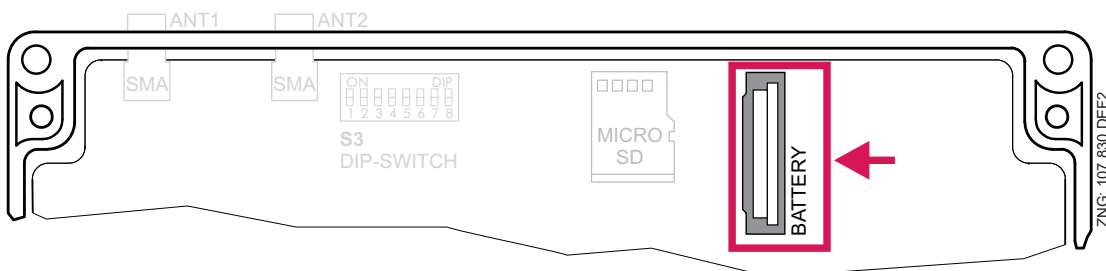
Never dispose of this product with other household waste. Please inform yourself of the local regulations for the separate disposal of electrical and electronic products. The correct disposal of your old equipment will protect people and the environment from possible negative effects.
You will find further information in the chapter "Decommissioning and Disposal".

Do **not** touch the new battery with metal pliers, as it might be short-circuited and destroyed:
- wipe the new battery with a clean, dry cloth,
- do **not** touch the contact faces on the edges of the new battery.

6. Pick up the new battery with a cloth and push it into the battery holder.

7. Assembly is conducted in the opposite order. Re-connect all plugs.

8. Supply the receiver module with power. The receiver module is now operational again.

9. **Receiver Module in CAN bus system:** With unchanged store computer configuration, the receiver module will be automatically recognised via the CAN bus (if required, check in the system centre / store computer or alarm terminal).
Date, time and automatic switching between summer / winter time is conducted automati cally via the central time synchronisation.

10. **Receiver module without CAN bus:** The input (e.g. with BT 300) of date, time and automatic switching between summer / winter time is required for data archiving.

5.4.2   TS 30 W / TS 30 XW

The batteries in the wireless sensors are not designed to be changed. In the event that the receiver module generates the message Batt.schwach ID XXX (ID = sensor identification number), then this wireless sensor must be quickly replaced by a new one. The old wireless sensor is to be disposed of in a proper manner.

New wireless sensors can be ordered using the following article numbers:
TS 30 W   KGLTS30W01
TS 30 XW   KGLTS30XW1

Old wireless sensors are to be disposed of in a proper manner,
see chapter 9 - Decommissioning and Disposal.

5.5   Firmware update

The device is supplied with the current firmware, ready for operation. Future software versions can be loaded into the device as required by means of a firmware update, and thus updated.

A software update is only to be carried out by trained staff or factory-side by the manufacturer.

Danger data loss! The loading of software via firmware update must not be interrupted. The power cable and USB A-B cable must not be disconnected during the firmware update. It must be ensured that power is supplied throughout the entire procedure. An interruption of the firmware update can result in an inoperative controller. In some cases a change of firmware version can lead to the loss of all the setpoints in the controller. As a precaution, the settings **should** be backed up by saving them to the LDSWin PC software, **prior** to the update.
After the firmware update the backup settings can be reloaded into the controller from LDSWin.

ECKELMANN

5.5.1 Firmware Update requirements

The following components are required for a firmware update:

- Notebook or PC
- USB A-B cable   (Accessories)
- The installation program "*Firmware_Uploader_Setup_vxx.exe*"   (available from manufacturer)
- Current firmware in the binary file "WRxx_vx.xx.bin"   (available from manufacturer)

☞   **Administrator rights required during initial installation!**
With the operating systems Windows 2000, XP, Vista and Windows 7, the user **must** have **administrator rights** during installation when the installation program "*Firmware_Uploader_Setup_vxx.exe*" is being executed. Administrator rights will also be required when the controller is initially connected to the PC and the driver is installed by the operating system.

Following installation and the initial connection of the controller to the PC administrator rights are no longer required.

In the event of questions concerning administrator rights under Windows, the responsible IT administrator should be consulted.

Step 1: Install the software

1. Before first connecting the controller to the PC the
installation program "*Firmware_Uploader_Setup_vxx.exe*" must be executed once.
Please follow the instructions given by the installation assistant.

In the following window the components to be installed can be selected.
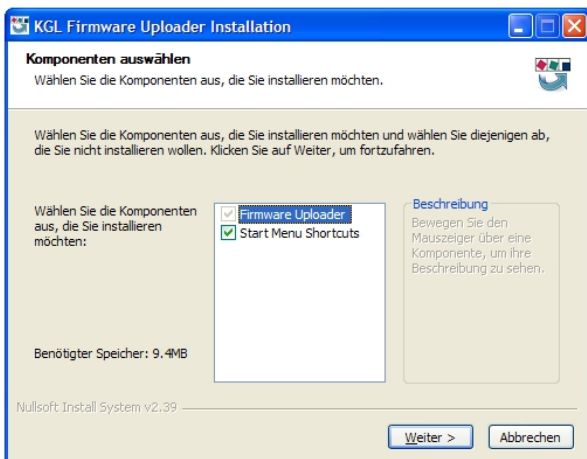
Now select the target folder:
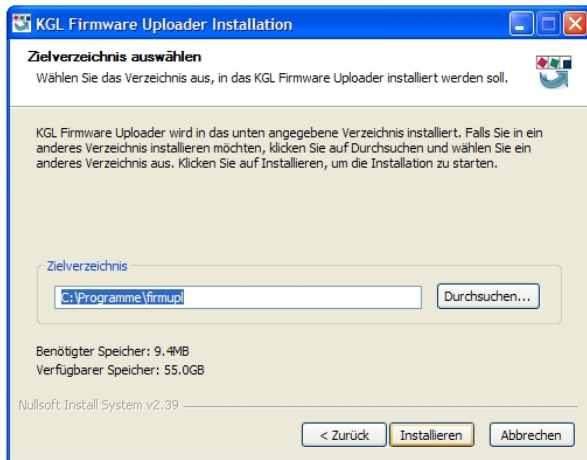
Following installation the PC must be restarted:
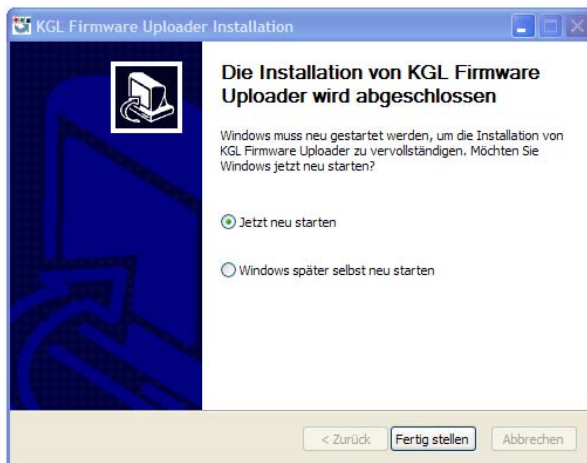
Step 2: Changing the position of DIP switch S3 and connecting the controller

☞   The original position of the coding switches 1..8 of the DIP switch S3 must be documented!

1. In order to carry out the firmware update all coding switches 1..8 of DIP switch S3 **must** be set to **ON**.
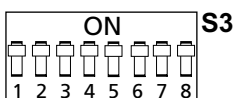
☞   **After** the firmware update has been carried out all the coding switches 1..8 of the DIP switch S3 **must** be **returned to their original position**, see chapter 5.5.2

2. Connect the controller while off load to the PC via a USB A-B cable:
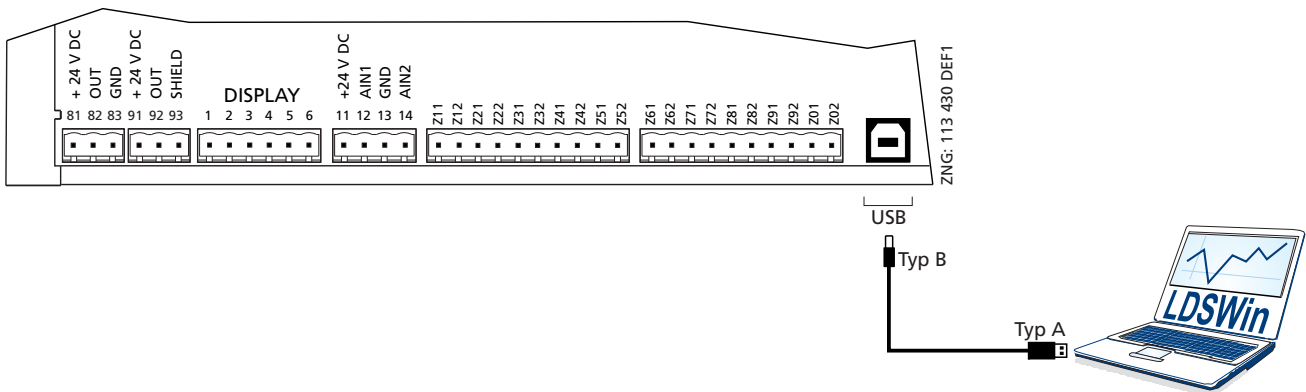
3. Now supply the controller with power.

Step 3: Installing the driver

When **first** connecting the controller to the PC the "Assistant for finding new hardware" opens. Please follow the instructions of the assistant:
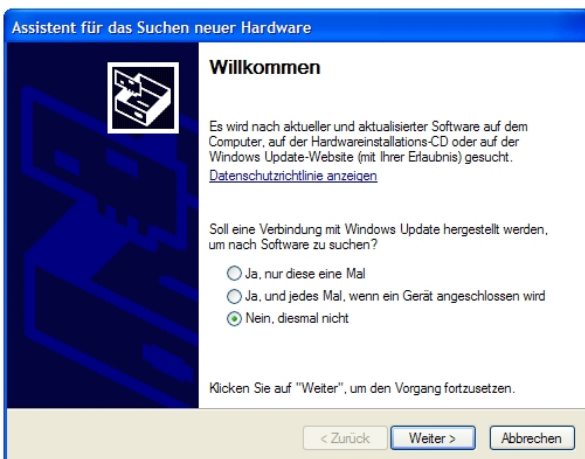
No error message such as "*USB device not found*" should appear on the notebook or PC!
Otherwise tips for rectifying driver problems are explained in more detail in chapter 5.5.3.

ECKELMANN

5.5.2   Uploading the firmware update

☞ In order to carry out a successful firmware update the steps described in chapter 5.5.1 must be carried out once for each PC.

Step 1:
Under "*Start / Programs / ECKELMANN / Firmware Uploader*" start the program "*KGL Firmware Uploader*".
The following window opens:
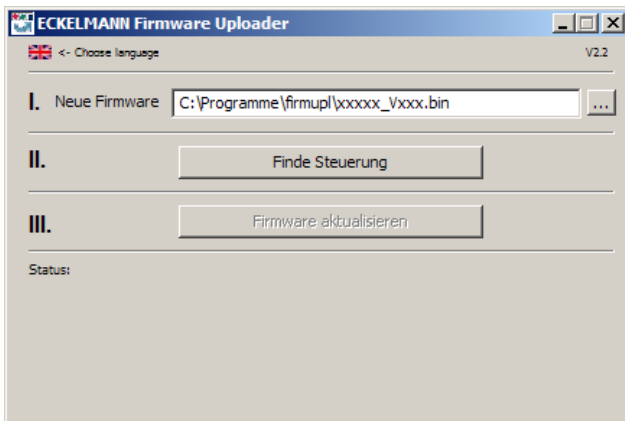
Select language, and then select the path to the folder for the new firmware binary file e.g. .BIN- bzw. .WRZIP file.

Step 2:
Connect the controller while off load to the PC via a USB A-B cable, **and then** supply the controller with power.

Step 3:
Press the button "*Find Controller*" in order to locate the controller. Then press the button "*Update Firmware*" in order to start the firmware upload.
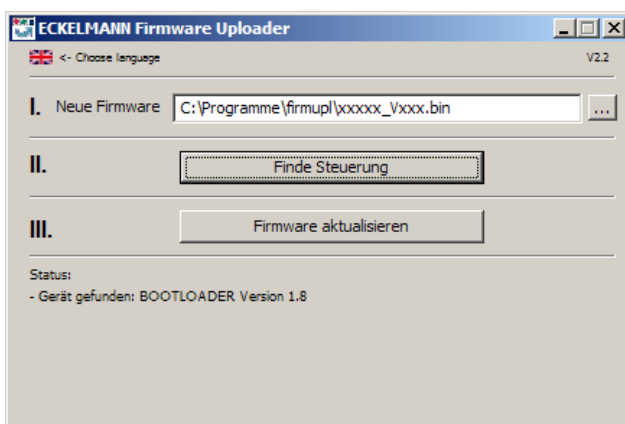
Step 4:
Following the start of the firmware upload a confirmation window appears, confirm this with "**YES**".
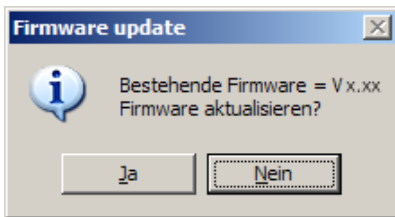
Step 5:
Following the successful firmware update the program can be closed.
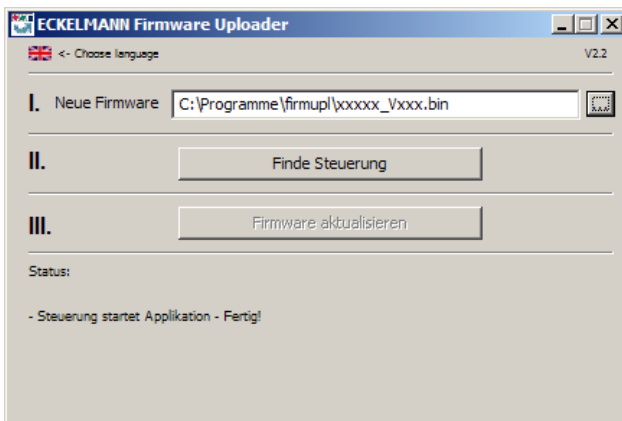
The USB A-B cable can now be disconnected from the controller.

Step 6: DIP switch S3 returned to original position

Danger of failure of controller!
After the firmware update has been carried out all the coding switches 1..8 of the DIP switch S3 **must** be **returned to their original position**. The controller only accepts the settings for DIP switch S3 **after** the controller has been briefly disconnected from the power supply!

After the firmware update the backup settings can be reloaded into the controller from LDSWin as required.

5.5.3　Rectification of driver problems

Should the driver installation be incomplete or should the controller have been accidentally connected to the PC before the execution of the installation program, then the following instructions will provide you with information on how the problem can be rectified:

Windows XP/Vista: If the controller was accidentally connected to the PC before the execution of the installer, then the driver **must** be updated in the system control.

First of all it must be ensured that the installation program for the firmware upload was executed: In the start menu, under *"Settings" - "System Control" - "Administration" - "Computer Administration"* - *"Device Manager"* - select *"Connections (COM and LPT)"* and with the right hand mouse button select the incorrectly installed COM port (*"UA 400 COM Port"* oder *"WR 300 COM Port"*).

Then press *"Update Driver"* and follow the instructions in the drop down menu; the driver should now be correctly installed.

Windows 7: In the start menu select "System Control", then *"Hardware and Sound" - "Devices and Printers"* - *"Device Manager" - "Connections (COM & LPT)"*. Then proceed as described above.

Special features under Windows 7: When executing the program, the request *"Do you want to allow the following program from an unknown publisher to make changes to this computer?"* is to be confirmed with YES. If this request is to be permanently masked, then the following procedure is recommended:

In the folder *"C:\Programme\firmupl"*, click on the file *"firmupl.exe"* with the right hand mouse button. In the drop down menu under *"Properties"* select the entry *"Allow"*. The request should no longer appear during the next start.

ECKELMANN

6 Pin and Terminal Assignments

6.1 Terminal diagramm of the receiver module WR 300 / WR 400
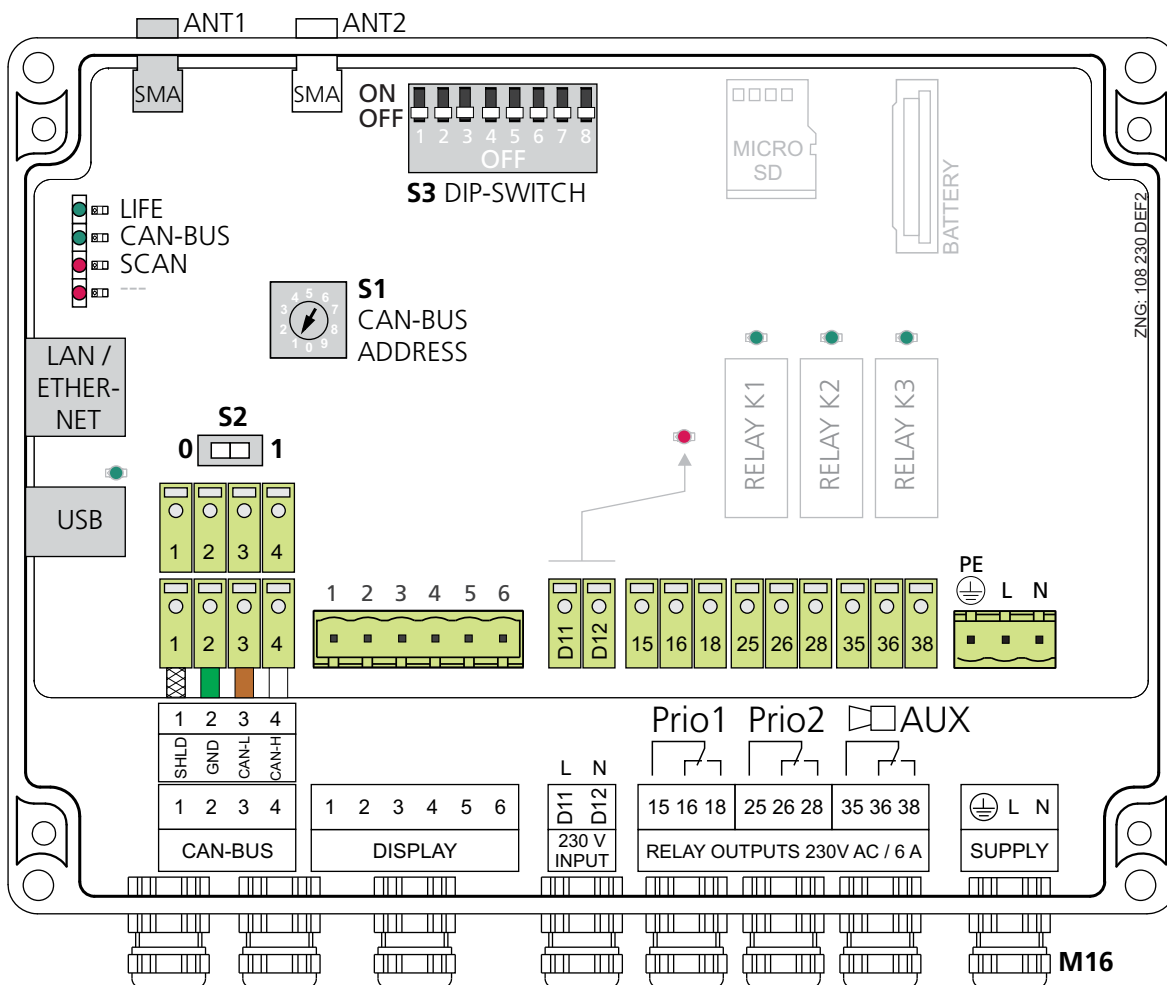
Receiver module connection diagram with terminal configuration, shown here for the complete hardware version of the WR 400. Following connection of the power supply the LIFE LED flashes, see chapter 5.2.5.1 - Status LEDs.

A detailed description of the connection and terminal configuration of the receiver module is contained on the following pages.

6.1.1 Terminal assignment of the 230 V AC power supply

Warning - hazardous electrical voltage!
Danger of electric shock! BEFORE and after connecting and disconnecting it must be checked that the 230 V AC power supply cable is **off load!**

Terminal no.	Function
PE, L, N	230 V AC power supply (SUPPLY) at the COMBICON: neutral conductor, phase 230 V AC, ground conductor

6.1.2 Terminal assignment of the 230 V AC relay outputs

Warning - hazardous electrical voltage!
Danger of electric shock! BEFORE and after connecting and disconnecting it must be checked that the 230 V AC power supply cable is **off load!**
Low voltage **and** safety extra-low voltage must not be applied together at the relay outputs 15/16/18, 25/26/28 and 35/36/38.

Terminal no.	Function
15 (Common) 16 (Break contact) 18 (Make contact)	Alarm relay PRIO1
25 (Common) 26 (Break contact) 28 (Make contact)	Alarm relay PRIO2
35 (Common) 36 (Break contact) 38 (Make contact)	AUX - relay for e.g. external alarm transmitter/horn

6.1.3 Terminal assignment of the 230 V AC digital input

Warning - hazardous electrical voltage!
Danger of electric shock! BEFORE and after connecting and disconnecting it must be checked that the 230 V AC power supply cable is **off load!**

Terminal no.	Function
D11, D12	Digital input for suppressing alarms, see chapter 4.1.5

6.1.4 Terminal assignment of the CAN bus

Warning - hazardous electrical voltage!
If mains voltage is connected to the CAN bus terminals,
this will result in the destruction of all components connected to the CAN bus!

Leads running of the CAN bus must be shielded (cable type: LiYCY)! As a general rule, care should be taken to ensure that signal leads and leads carrying a supply voltage are routed through separate cable channels.

Terminal no.	Function
1 1 (connected with one another internally) 2 2 (connected with one another internally) 3 3 (connected with one another internally) 4 4 (connected with one another internally)	Shield (Shielding) CAN-Ground CAN low CAN high **Note**: Switch S2 must be set to 1 when the receiver module is at the start/end of the CAN bus, see chapter 5.2.4.1.

6.1.5 Terminal assignment of the SMA antenna

Terminal no.	Function
ANT1	SMA connection for the antenna / antenna extension
ANT2	Currently without a function

6.1.6 Terminal assignment of interfaces

Terminal no.	Function
1..6	DISPLAY interface - connection to operator terminal of BT 300 series - currently without function, WR 400 only.
USB	Type B interface for firmware update (in future it will be possible to connect a notebook (PC) to this interface for the direct parameterisation via LDSWin)
LAN / Ethernet (only WR 400)	For incorporating the integrated web server in a network. The temperature data can be accessed using an Internet browser (e.g. Mozilla Firefox).

6.2   TS 30 W / TS 30 XW

No connection or wiring options available.

The wireless sensors are equipped with

- one integrated battery and

- one integrated reed contact for activation (see chapter 5.2.10 - Activation of sensors).

7 Operation of WR 300 / WR 400

7.1 Operation possibilities

The controller provides menus and screens for the display and adjustment of values. However, no operation for this is provided on the controller itself. The actual operation of these menus is performed externally using the following possibilities:

- **Local operation with a BT 300 x operator interface - WR 400 only:** The operation is performed directly on-site at the controller with an operator interface of the BT 300 series.
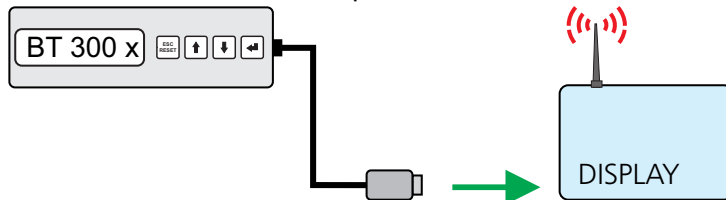
See chapter 7.2 for details for the operation.

- **Remote control via the terminal:** The controller can be operated remotely (e.g. from the machine room) using the system centre, a store computer or an operator terminal. The communication with the controller is performed via the CAN bus
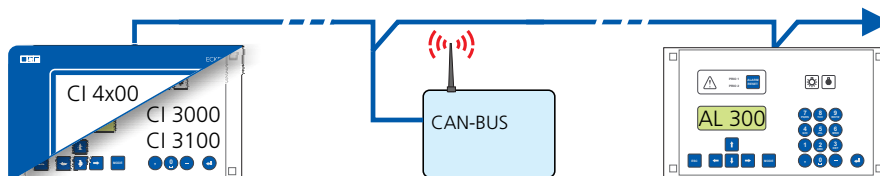
See chapter 7.3 for details for the operation.

- **Remote control with PC software LDSWin:** A PC with LDSWin installed is connected to the system centre or the store computer. The connection can be made here, for example, via the serial interface, a modem, a network or the PC-CAN bus adapter. In this way, the controller can be operated very conveniently with the PC software and its powerful functions such as controller analysis, evaluations, storing parameter sets, creating lists, etc.
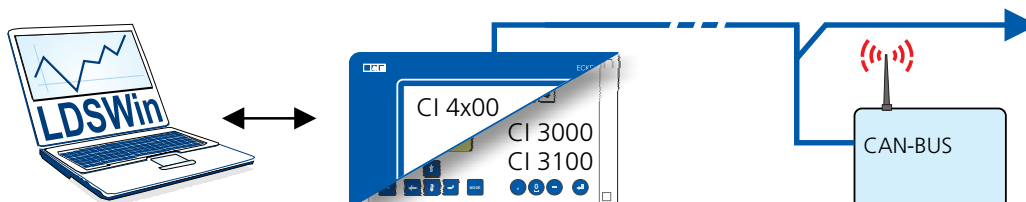
See the LDSWin operating instruction for details about the range of functions.

7.2   Local operation with a BT 300 x operator interface - WR 400 only
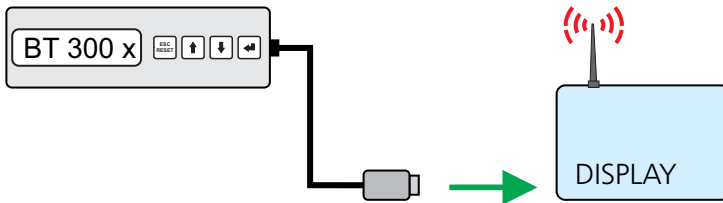
An operator interface in the BT 300 series is connected locally via the DISPLAY interface. Thereby, the controller can be operated standalone as shown or also connected to the CAN bus.

The operation here largely corresponds to the possibilities as described for the system centre, the store computer and the operator terminal; see chapter 7.3.1 for details.

If no buttons are pressed, the display of the BT 300 x operator interface shows the name of the controller and its position designation. The ENTER button (↵) must be tapped to return from the display of the operating status back to the Operation menu.

☞   Device-specific limitations arise due to the smaller display (only 2 rows x 20 characters) and fewer buttons as compared with the system centre, the store computer and operator terminal.
Operation with a system centre, store computer, operator terminal or the PC software LDSWin provides more functional possibilities.
Technical details about the operator interfaces can be found in their operating instructions.

7.2.1   Lock-down of the setpoint change

The operator interfaces of the BT 300 series can be locked using a jumper on the circuit board so that all actual values, parameters, temperatures and statuses can be viewed, but so that it is no longer possible to adjust the setpoints of the respective controller.
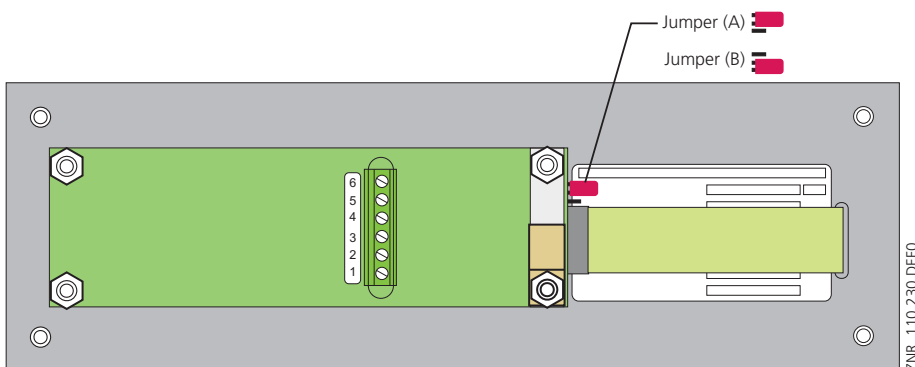
Jumper setting A: with setpoint change
Jumper setting B: without setpoint change

The operator interfaces are set to the jumper position A (with setpoint change) at the factory.

⚠   If operator interfaces are mounted in areas accessible to the public, i.e. on serving counters for the sales personnel, the jumper position **B** should be selected (without setpoint change).

7.3   Remote control via a terminal

☞ Further details for the operation of a system centre, store computer or operator terminal can be found in their operating manuals.

For the remote control of a controller, it makes no difference whether this is done with a system centre (A), a store computer or with an operator terminal (B) as the user interfaces on the terminals are almost identical and the same functions are available. See chapter 7.3.2 for details about remote control.

The system centre only emulates the "hardware front" of its "store computer" predecessor or of the operator terminal by software on its touchscreen which is demonstrated by the following comparison between the terminals of the CI 4x00 and CI 3x00 / AL 300:
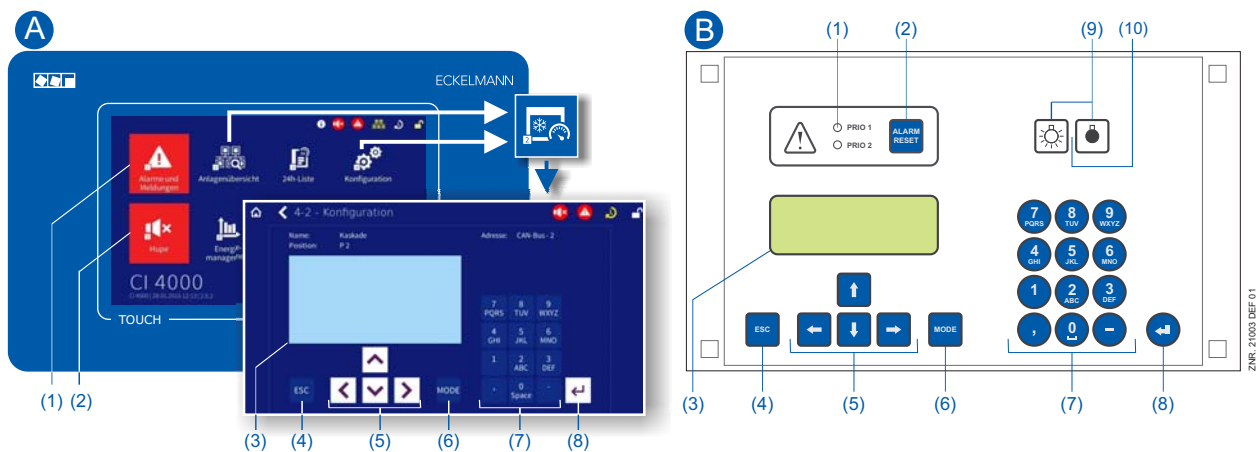
(1)   CI 4x00:   "Alarms and messages" button in the main menu for display of whether alarms are pending.

                          Alarms are acknowledged in the "alarm list".
      CI 3x00 / AL 300:   Red LED signal lamps to indicate whether alarms are pending.

(2)   CI 4x00:   "Horn" button in the main menu for muting of the buzzer and for reset of the AUX relay.

      CI 3x00 / AL 300:   Button for muting of the buzzer, for reset of the AUX relay* and for acknowledgement of alarms.

(3)   Display (4 lines x 20 characters) for display of the menu of the controller.

(4)   **ESC** button

(5)   Cursor buttons

(6)   **MODE** button for, e.g. toggle upper case / lower case for text input.

(7)   Alphanumeric keypad

(8)   **ENTER** button (↵)

Only CI 3x00 / AL 300:

(9)   On/Off button for, e.g. lighting

(10) Green LED signal lamp for status indicator whether the button is activated (then green) or deactivated.

7.3.1 Menus and operating screens

☞ If the system centre, store computer or operator terminal remain locked down, settings on the controller are read-only.
Changes and inputs are not possible. However, if any parametrisation is required, the lock-down for the input must be removed first, see chapter 7.3.3.

Numbering of menus and screens:

Every menu in the menu tree can be reached using a specific number and every operating screen in a menu can be reached using a specific selection in the menu. This is identified in the operating manual by a unique identifier of digits (and letters if necessary) in the menu tree (e.g. Menu 3-1-2-a). Thereby, the digits 1, 2, .. stand for the identification of the corresponding menu, and the letters a, b, .. stand for the sequence of the corresponding operating screens in the menu.

Example for the numbering of a menu / screen

Any reference to, for example Menu 3-1-2 in the operating manual means that the required menu of the E*LDS component is called by entering the digits or selection of "3 - 1 - 2" via the remote control in the system centre, store computer or operator interface. The menu item "Remote control" is the interface for the E*LDS controller; see chapter 7.3.2 for details.

If any letter is appended (e.g. Menu 3-1-2-a), this means that another submenu (operating screen or selection list) can be reached using the cursor right button (→). The letters indicate their sequence in the screen.

If any menu or operating screen consists of more lines than are possible in the display, scrolling is possible using the cursor buttons (↑) and (↓).
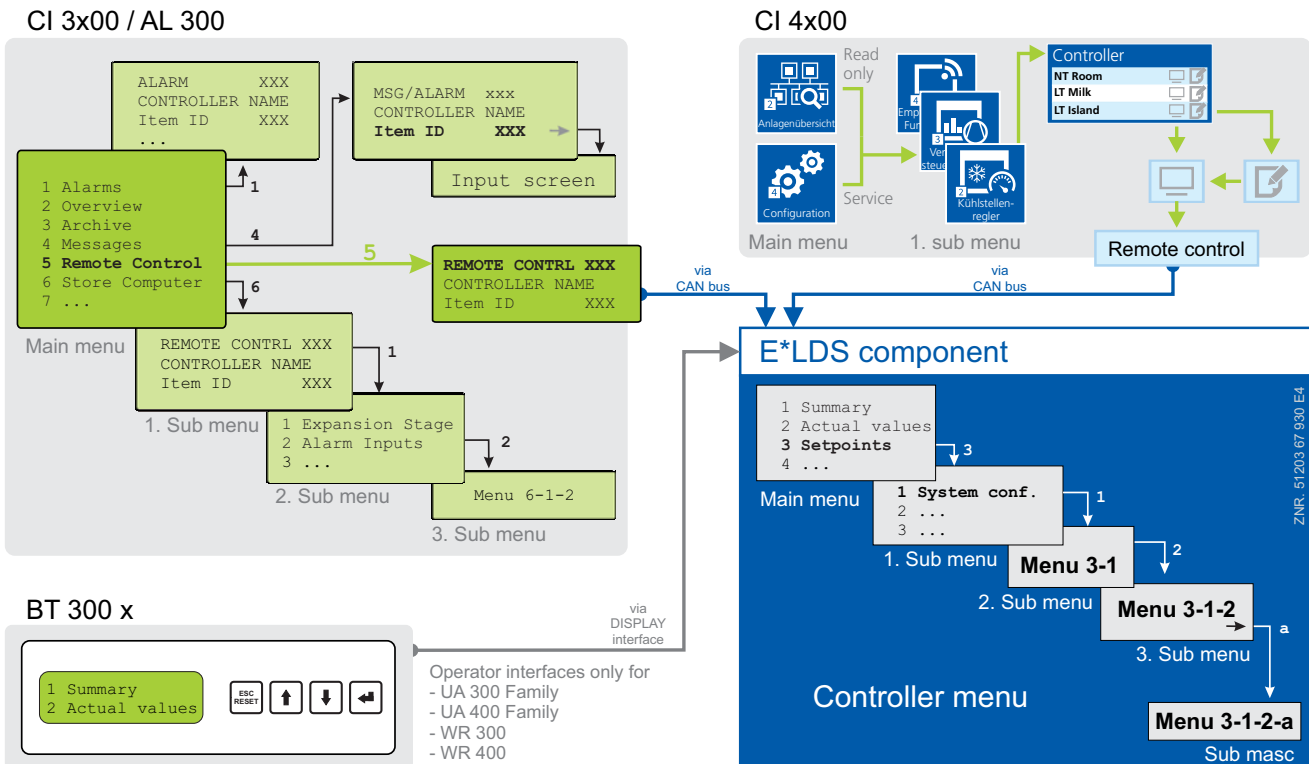
☞ In contrast to the system centre, store computer or operator terminal,
the menu of the controller is displayed directly on the operator interface.

ECKELMANN

Menus

A menu can contain up to ten menu items (0 .. 9; 0 for menu item 10). After the selection of a menu item using the cursor buttons (↑) and (↓) and by tapping the ENTER button (↵) or by tapping the buttons 0..9), other sub-menus or operating screens are displayed.

Selection of the menu items

Each line of this selection list in the display has a digit between 1 and 9 and 0 for menu item 10 with the associated name of the corresponding menu item. The various menu items can be selected directly by tapping the digit buttons 0 .. 9.

If a menu provides more than 3 submenus, the cursor buttons (↑) and (↓) can be used for paging in the menu to display the remaining menu items.

☞ A menu item can be selected by pressing the respective numeric key regardless of whether the item itself is visible on the display.

Screens

An operating screen shows values for output and/or input. There may be more values for output and/or input than fit into the display at one time. The cursor keys can be used to scroll through these additional values. The screen may also contain more than one page, in which case the pages can be viewed one at a time.

☞ Arrows appear on the right of the display to indicate whether you can scroll or page through a menu or screen.

Scrolling

Using the cursor buttons (↑) and (↓)

- scrolling can be line by line, e.g. for selection of a variable in a line from a list of predefined variables.

- scrolling can be block by block so that values can be shown that cannot be displayed with the others due to the limited capacity of the display

Paging

If an operating screen contains multiple pages (e.g. the alarm list), these can be paged through using the cursor buttons (←) and (→). In menus that provide more than 3 submenus, these can be paged through using the cursor buttons (↑) and (↓) to display the remaining menu items.

MODE + 9 three lines upwards and
MODE + 3 three lines downwards

Input of values and text

Select the required line using the cursor buttons (↑) and (↓) and then tap the ENTER button (↵). The cursor jumps to the input field. Values can now be entered and changed using the cursor buttons (↑) and (↓) or digit buttons.
If the cursor buttons (↑) and (↓) are kept pressed, the adjustment is made in high speed mode.

Deleting input text

The **MODE** button and **-** must be pressed simultaneously to delete the complete text line.
A character is deleted using the button combination **MODE** and **,** .

Cancelling of an entry

The entry of a value can be cancelled by tapping the **ESC** button. The value is not applied.

ECKELMANN

Entering text

In fields that allow text entry, text can also be entered by the alphanumeric keypad. Repeatedly press the numeric keys to generate letters. Press the ENTER key (↵) to confirm the entered value or text.

Key	Letter/Character
0	äöüß0, space character
1	1
2	abc2
3	def3
4	ghi4
5	jkl5
6	mno6
7	pqrs7
8	tuv8
9	wxyz9
-	. _ -
,	Insert space character

☞ Upper case and lower case can be toggled by tapping the **MODE** button.

Exit from the menus and operating screens

Press the **ESC** key to exit the menu or screen you are in at any time. This returns you to the next higher menu. All menus and screens are closed automatically if no key is pressed for 10 minutes. The display then jumps to the Main Menu or to the Alarm menu if any fault report is currently active (only CI 3x00 / AL 300).

7.3.2 Calling the controller menu via remote control

☞ If the system centre, store computer or operator terminal remains locked down, settings on the controller are read-only. Changes and inputs are not possible.

However, if any parametrisation is required, the lock-down for the input must be removed, see chapter 7.3.3.

Tip: Detailed descriptions for the basic configuration of the controller and its position designation or about the settings of important parameters can be found in chapter 5.6.

ECKELMANN

7.3.2.1 System Centre CI 4x00

The terminal for remote control of the controller (Menu 2-2 or Menu 4-2) is called in the system centre as follows:

Step 1: Tap "**2 - System overview**" or "**4 - Configuration**" in the main menu.
If "2" is selected, the values below are only displayed as read-only,
for "4", lock-down must previously be removed by logging in (see chapter 7.3.3) so that
settings below can be made.

Step 2: Tap "**2 Case controllers**" and select the required controller in the list that is then displayed
using the cursor buttons (↑) and (↓). In the screen that opens, the
name, position designation and the alarm priority of the controller can be input as required.

Step 3: The main menu of the controller is then displayed by tapping the "**Remote control**" button:

7.3.2.2 Store computer CI 3x00 / operator terminal AL 300

The main menu of the controller is called in the store computer or operator terminal as follows:

Step 1: Select the submenu "**5 Remote control**" in the main menu (see graphic).

```
Main menu
4 Messages              ↑
5 Remote control
6 Store computer        ↓
```
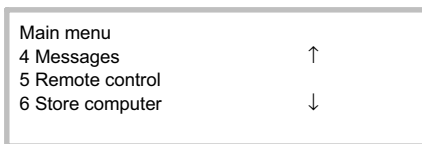
Step 2: Select the required controller using the cursor buttons (↑) und (↓) or
by input of the CAN bus address (node number nnn) using the digit buttons.
Thereby, the following screen is displayed:

```
REMOTE CONTROL   Kn.nnn
Node Name               ↑

Item ID            XXXXX↓
```
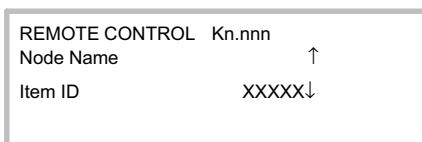
Step 3: The main menu of the controller is then displayed in the terminal by tapping the **ENTER** button

```
KÜHLSTELLE      Pos: XXXXX
1 Istwerte ↑
2 Sollwerte
3 Uhr                   ↓
4 Meldungen
5 Archiv
6 Konfiguration         ↓
```
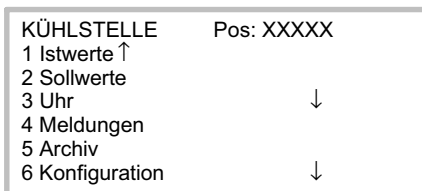
7.3.3 Deactivating the input lock-down

Operation via system centre, store computer or operator terminal is only possible for controllers with CAN bus connection; the removal of the lock-down is then applicable for all components in the CAN bus system. The lock-down is automatically reactivated 15 minutes after the last button tap.

☞ The release of the lock-down must only be carried out by service personnel.

Before entering values, the input lock-down must be removed as follows:

7.3.3.1 System centre CI 4x00

Login to and logout (unlock and lock-down) of the system centre:

Anmelden

Anmeldung
Benutzername Service
Passwort 0000
✓ ✗

Konfigurieren /
Sollwerte verändern
ist möglich

Abmelden (Systemzentrale wieder verriegeln)

Einfach Button drücken
oder
Abmeldung erfolgt
automatisch nach 5 Minuten

Benutzername: *Service*
Passwort: *0000*

Benutzername: *Master* (Erweiterte Rechte z. B. für spezielle Einstellungen am UA 410 E)
Passwort: *0000*

7.3.3.2 Store computer CI 3x00 / operator terminal AL 300

Before entering values, the input lock must be removed from the store computer or operator terminal as follows:

Step 1: Select menu item 9 "Parametrisation" in the main menu.

Step 2: Select menu item 3 "Lock-down" in this menu.

Step 3: **A. Unlocking store computer (standard)**
Tap the ENTER button (↵) to set the marker (√).
The lock-down has now been deactivated and it is possible to make settings.

or

B. Unlocking store computer and activating Superuser mode (Superuser permissions)
Input current date backwards (nothing is shown on the display).
Example: The current date is April 17, 2016, i.e. 17/04/16;
the required input for enabling Superuser permissions is then 614071.

Confirm the input with the **ENTER** button (↵); an **"S"** is shown on the display.

Step 4: Exit the operating screen and return to the main menu by tapping the **ESC** button twice.

☞ **Tip:** If you are already in the user interface of a CAN bus node but have forgotten to release the input lock-down, you can unlock the input lock-down for this controller using the button combination **MODE** and **,**. The input lock-down is active again as soon as you exit the user interface of the controller.

7.3.4   Activating service mode

For repair and maintenance work, service personnel can deactivate the remote alarm function of the system centre and of the store computer for a limited period using the service mode.

☞   The activation of the service mode must only be carried out by service personnel.
If there are still pending alarms (with the priority 1..2) after the time of the Service Mode has elapsed, the audible warning devices and the alarm relays are activated and the alarms are forwarded using the automatic transmission of alarms.

7.3.4.1 System centre CI 4x00

Activating/deactivating service mode

Service-Mode
Verzögerung [Min.]   255

Fernalarmierung
für 1..255 Minuten
unterdrücken

Service-Mode wieder aufheben

Button drücken
und 0 Minuten
eingeben
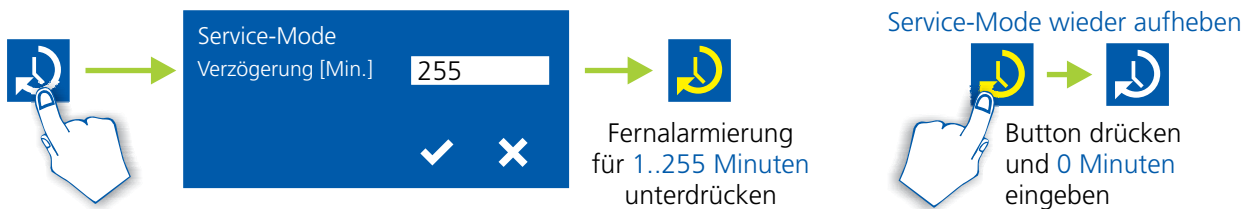
☞   The service mode can only be activated if the system centre has previously been unlocked; see chapter 7.3.3.1.

7.3.4.2 Store computer CI 3x00

Activating/deactivating service mode

Step 1:   Select menu item 9 "Parametrisation" in the main menu.

Step 2:   Select menu item 3 "Lock-down" in this menu.

Step 3:   Tap the buttons **MODE + ENTER** (↵) simultaneously to open the screen for the suppression of the remote alarm signalling and input the service duration (1..255 minutes).
The service mode is now activated for the duration entered above.

Step 4:   The service mode can be reset / revoked again by the input of 0 minutes.

7.4 Operation via a web browser - WR 400 only

The user interface of the WR 400 receiver module's browser serves to display the temperature data and status of the individual TS 30 W/XW wireless sensors as well as to set up and configure wireless sensor networks. The functions and data are provided by the receiver module's internal server.

7.4.1 Opening the user interface

The receiver module has a user interface which can be called up via a web browser.

- Start the web browser (e.g. Mozilla Firefox)

- Enter the IP address of the receiver module (factory-side IP: 192.168.161.2 or http://192.168.161.2) in the address bar and confirm using the enter key.
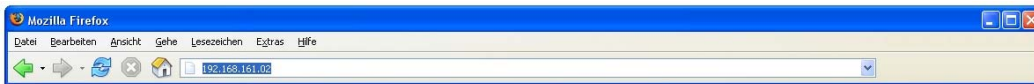
☞ For detailed information on the configuration of the receiver module's IP address see chapter 7.4.4.3.

- The user interface opens, see chapter 7.4.2.

7.4.2 User interface

All operating and display elements can be opened via the menu bar at the top of the page:

Description of the individual elements:

- **Sensor overview:** Tabular presentation of the current temperature data and the status of all wireless sensors. This page appears as the home page following entry of the IP address in the web browser's address bar.

- **24h archive:** Tabular presentation of the mean hourly values for all wireless sensors for a whole day and the absolute minimum and maximum temperatures per measuring point and day.

- **Individual archives:** Tabular presentation of all of a wireless sensor's measured data across a whole day

- **Alarm list:** All the alarm messages with the priorities 1 to 99 recorded by the receiver module

- **Info:** Explanation of the menu and details of the receiver module's current network settings. Following login (see chapter 7.3.3) the receiver module can be configured under this menu item.

Further information can be found under the menu item:

- **Left:** Name, CAN bus address and position indicator of the receiver module

- **Right:** Date and time of the last page update

☞ Detailed explanations of the individual elements are provided below.

7.4.2.1 Sensor overview

The page displaying the status of the wireless sensors is also the home page of the receiver module. It is displayed when the IP address of the receiver module is entered into the web browser.

WR 400	Sensor Overview	24h Archive	Single Files	Alarm Table	Info	ECKELMANN AG

Testgerät MW (CAN: 117), Pos.:*117*   03.03.2012 15:40

Sensor List 3.03.2012 15:40 (→xml)
Number of Sensors = 6 (6 / 0 / 0)

(data reload every 90s)

Sno.	ID	Name	Pos.	Ena.	Last Temperature Measurement		Signal Strenght		State	Messages
1395	1	Bedientheke Fisch	*001*	Y	4.0 °C	03.03.2012 15:25	-66 dBm	IIIIIIIII	ON	! Temperature Too High
1251	2	Kühlregal Mopro 1	*002*	N	10.0 °C	18.01.2012 14:36	-68 dBm	IIIIIIII	--	
1297	3	Kühlregal Mopro 2	*003*	Y	8.0 °C	03.03.2012 15:26	-50 dBm	IIIIIIIIII	ON	
1129	4	TK-Truhe Pizza	*004*	Y	−18.0 °C	03.03.2012 15:31	-71 dBm	IIIII	ON	
1277	5	Kühlregal Geflügel	*005*	Y	4.0 °C	03.03.2012 15:21	-84 dBm	IIII	ON	
1018	6	Kühlregal Hack	*006*	Y	4.5 °C	03.03.2012 15:31	-55 dBm	IIIIIIIIII	ON	
1144	7	Bedientheke Torten	*007*	Y	7.0 °C	03.03.2012 15:26	-77 dBm	IIIII	ON	

Legend: !   Sensor in Alarm
          *   Defrosting
         (*) Steep Temperature Slope
          L   Battery Low
         Zzz Sensor Switched Off

The following information on the wireless sensors is provided in the overview:

- Date and time of the last update

- Link to the XML presentation of the overview table

- Number of wireless sensors and their status: x (a / b / c)
    x = total number of enabled wireless sensors
    a = number of wireless sensor with online status (green)
    b = deactivated wireless sensors (blue)
    c = number of wireless sensors with offline status (orange)

The table presents the following information for each wireless sensor:

- **SNo.:** Serial number of the wireless sensor (on the front of each wireless sensor, see chapter 5.2.9)

- **ID**: Unique identification number for each of the wireless sensors detected by the wireless sensor. The number is automatically allocated during the registration of a wireless sensor. A maximum of 100 wireless sensors can be detected by each receiver module (with IDs from 1 to 100).

- **Name**: Freely selectable name for the measuring point with a maximum of 19 characters,
  e.g. "Refrig. shelf 12"

- **Enable** (see chapter 7.4.5.4):   Y = wireless sensor enabled
                                         N = wireless sensor not enabled.

- **Last temperature measured:** Date, time and temperature of the last measurement.

- **Signal strength**: The signal strength in dBm (decibel milliwatts) is a measure of the wireless sensor's transmission. The green bar provides a qualitative indication of the strength of the radio connection, thus facilitating the identification of unfavourable positions for wireless sensors (see chapter 5.1.2) or, if required, a repositioning of the antenna for the receiver module (see chapter 5.1.3).

ECKELMANN

- **Status**: There are two possible connection statuses for the wireless sensors which are additionally indicated by colour coding:

    ON (green): Wireless sensor is currently in contact with the receiver module
    (is online)

    OFF (red): Radio connection between wireless sensor and receiver module is interrupted
    (is offline).

- In addition there are the following statuses which are also explained in the legend at the foot of the table:

    ! = wireless sensor is in the alarm state
    * = refrigeration point is being defrosted
    (*) = strong rise in temperature (only with active automatic defrost recognition; see chapter 4.2.7)
    L = low battery status
    Zzz = wireless sensor is "sleeping"

- **Messages**:
    - High temperature
    - Low temperature
    - Wireless sensor is defect

1. The sensor overview is updated every 90 seconds in order to retrieve new data from the receiver module's internal server. Independent of this the display can also be updated via the web browser's reload, i.e. "Reload / update page" button (as a rule F5) or by means of a renewed call up in the menu bar.

2. The output as XML file is primarily designed to provide a rapid overview of the XML structure. For further details see the XML documentation.

Praxis tips:

- Rapid access to all of a wireless sensor's measured data for a 24h period. By clicking on the name of the wireless sensor one can directly access its day's archive (see also **Individual archive**).

- If one passes over the temperature value with the mouse the limit values for the high and low temperature (see configuration) are displayed via Tooltip, e.g. the limits. max: 10.0 °C / min: 7.0 °C.

7.4.2.2 24h archive

The 24h archive summarises the measured temperature values for a 24h period. The following values are displayed for each measuring point: Mean hourly value, daily average (Ø), minimum and maximum temperature with the time of the measurement.

In order to rapidly identify and evaluate deviations from the limit values the display of the mean hourly values is augmented by colour coding and symbols:

! = at least 1 alarm within this hour
* = a defrost event has been registered
Orange = the wireless sensor's temperature limit has been exceeded at least once in this hour
Red = the wireless sensor's temperature limit has been exceeded at least once in this hour by more than 2 K

For further details on defrost recognition see chapter 4.2.7.

24h temperature lists for other days can be selected by scrolling through the table
(pointed brackets, see arrows):

☞ The receiver module's data memory is sufficient for 1 year, older entries in the ring buffer are over-
written with new data.

7.4.2.3 Individual archives

Individual archives provides an individual data archive for each wireless sensor enabling all the measured data
from a 24h period, in accordance with the factory-side measuring interval of 5 minutes, to be viewed by scrolling
(pointed brackets, see arrows). A further scroll navigator is provided for selecting the desired wireless sensor.

The following statuses are indicated by symbols and colours in the Individual archive display:

*	= refrigeration point is being defrosted
L	= low battery status
Zzz	= wireless sensor is "sleeping"
Red	= maximum limit value for the wireless sensor has been exceeded (high temperature)
Light blue	= minimum limit value for the wireless sensor has been undershot (low temperature)

Screen for displaying the individual archives:

☞   Current alarm messages are displayed as text messages in the right hand column "Alarms":

Praxis tips:

By clicking on the name of the wireless sensor in the Sensor overview the corresponding individual archive can be accessed quickly and directly.

7.4.2.4 Alarm list

The alarm list provides detailed information on all alarm messages. The messages are each assigned a sequential number. Alarm input (received time stamp) and the end of the alarm (cleared time stamp) are recorded.
For quicker orientation active alarms are displayed in red text:

In addition, the alarm list also records alarms from the receiver module itself (e.g. power failure). A "0" can then be seen in the "ID" column.

7.4.2.5 Info

Explanations of the web browser user interface as well as information on the current connection data such as IP address, subnet mask, gateway and MAC address.

7.4.3 Password protection and changing the password

In order to protect the wireless sensor network from unauthorised access the settings for the wireless sensor system are protected by a password.

Registration - login:

1. Click on the lock symbol (top right hand corner beneath the main navigation bar)
2. Enter the password (factory side the password is: 1234567)
3. Following successful registration it is now possible to switch to either Sensor overview or parameterisation of the receiver module using the selection buttons

WR 400	Sensor Overview	24h Archive	Single Files	Alarm Table	Info	ECKELMANN AG

*Testgeraet MW (CAN: 117), Pos.:*117** 11.12.2012 14:08

LOGIN

Password: [   ] →
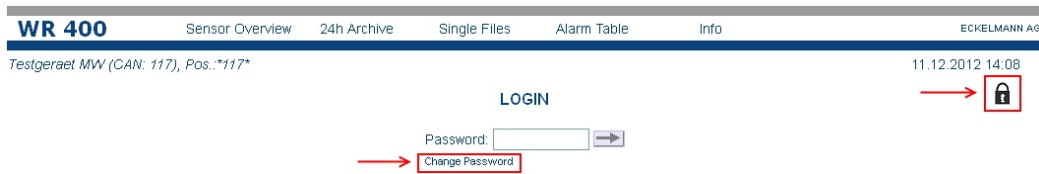
Change Password

Changing the password:

In order to prevent unauthorised access to the wireless sensor system it is recommended that a new password be assigned immediately upon commissioning. This can be done using the option "Change Password" in the login dialog. The password may contain the following alphanumerical characters: 0-9, a-z and A-Z.

☞ Changes to the configuration of the wireless sensor system are only possible with a password. Consequently, the password must be remembered or recorded at a secure location!

Deregistration - logout:

In order to deregister click on "logout" which appears at the same position as the lock symbol following registration.

☞ If no changes are made for a period of ten minutes then an automatic deregistration is conducted on security grounds. Re-registration is required.

7.4.4 Parameterisation of the receiver module

Following registration a page appears with the input screen for the parameterisation of the receiver module. The input screen is divided into the following sections:

- Language selection

- Naming of the receiver module

- Configuration of connection data (IP address)

- Setting the time and date

- Defining the alarm priorities

☞ Following login the input screen for the parameterisation of the receiver module can also be accessed via the menu item "Info".

Input screen for the parameterisation of the receiver module:

During **initial commissioning** the corresponding entries are to be made. By clicking on the "SUB-MIT" button these are then transmitted. **Data which has not been sent is not adopted!** Detailed explanations of the individual elements are provided below.

ECKELMANN

7.4.4.1 Language selection

The receiver module user interface is available in the languages German, English and Polish. Once the corresponding flag symbol at the top right hand corner has been clicked the language change becomes immediately effective.

7.4.4.2 Naming of the receiver module

Assigning the name and position number for the receiver module. These details are displayed on the left beneath the navigation menu.

- Enter the name
  (maximum of 19 alphanumerical characters, no special characters apart from "ß" and the umlauts ä, ö, ü)

- Enter the position number
  (maximum of 5 alphanumerical characters, no special characters)

- Confirm the changes using the "SUBMIT" button.

7.4.4.3 Configuration of connection data (IP address)

If, following changes to the connection data, it is no longer possible to access the receiver module then the IP address can now only be changed via the BT 300 operator interface!

Configuring the IP address, subnet mask and gateway for the receiver module:

1. Enter the IP address, subnet mask and gateway.

2. Confirm the changes using the "SUBMIT" button.

3. The changes are accepted.
   The receiver module is immediately accessible via the new IP address.

4. Enter the new IP address in the web browser's address bar and
   re-register if required in order to continue with the configuration.

Factory side, the receiver module is configured with the following network address:

IP address: 192.168.161.2
Subnet mask: 255.255.255.0
Gateway: 192.168.161.254

The connection data is to be changed as required as every network node must be addressed via a unique IP. This is especially the case with the operation of several receiver modules.
The network addresses to be set are to be obtained from the network administrator.
If it is not possible to establish a connection to the receiver module then the IP address or the network settings must be checked (see chapter 5.3 - Connection via LAN).
If, despite having correctly set the network addresses, it is not possible to establish a connection then the web browser's proxy settings must be checked.

7.4.4.4 Setting the time and date

Changes to the time and date can result in inconsistencies in the recording and archiving of temperature data!

The setting of the time and date is an essential precondition for the correct recording and archiving of temperature data:

1. Enter the date (dd.mm.yy).
2. Enter the time (hh:mm).
3. Select whether the system should automatically switch between summer and winter time.
4. Confirm the changes using the "SUBMIT" button.

7.4.4.5 Defining the alarm priorities

Here the alarm priorities for the receiver module are set. The alarm list contains alarms of the priority 1 to 99. Alarms with the priority 0, i.e. the complete message list, can only be accessed via the store computer. The option "--" results in the corresponding alarm being ignored.

Details of the standard settings and further explanations of the specific alarm messages and alarm priorities of the receiver module.

  - Enter the desired alarm priority.

  - Confirm the changes using the "SUBMIT" button.

In the event of uncertainty the standard values should be used.

ECKELMANN

7.4.5   Adding, configuring and deleting wireless sensors

☞   In order to configure wireless sensors one must be logged in!

For the administration of the wireless sensors it is necessary to switch to Sensor overview. For each of the listed wireless sensors a tool symbol appears to the left of the sensor ID. Clicking on this symbol calls up the configuration screen for the wireless sensor.

☞   Above the sensor list is the input field "Add Sensor".
Below the sensor list is the input field "Delete Sensor".
Detailed explanations of the individual elements are provided below.

7.4.5.1 Adding a new wireless sensor

Before a wireless sensor can be configured it must be added to the wireless sensor network. This is done using the input field above the sensor list:

-   Enter the serial number (SNo.) of the wireless sensor. Every wireless sensor is assigned a unique serial number located on the front of the wireless sensor, see chapter 5.2.9.

-   Confirm with the "Add Sensor" button

-   The new wireless sensor appears in the table

The receiver module immediately starts an automatic search for the new wireless sensor.

Praxis tips:

a) As the table is not equipped with a sort function and wireless sensors are added with a sequential ID it is necessary to carefully plan the sequence of entries in advance so that the measuring points (1 to 100) are easier to identify at a later date. For example, the spatial distribution of the measuring points could serve as orientation.

b) In chapter 11.5 - Sensor list - a practical commissioning table is provided for printing. This can be used to note the serial numbers and wireless sensors directly at the measuring points. The individual wireless sensors are subsequently registered via the web browser using this data.

7.4.5.2 Deleting a wireless sensor

With the deletion of a wireless sensor from the wireless sensor network all of its configuration and archive data is permanently deleted!

The input field beneath the sensor list can be used to delete wireless sensors:

- Enter the serial number (SNo.) of the wireless sensor. Every wireless sensor is assigned a unique serial number located on the front of the wireless sensor, see chapter 5.2.9.

- Enter password

- Confirm with the "Delete Sensor" button

- No more data is recorded for the wireless sensor and it no longer appears in the sensor list.

Praxis tips:

As an alternative to deletion the sensor enable can be revoked (see chapter 7.4.5.4).

The archive data is thus preserved, however no new data is recorded for the corresponding wireless sensor.

Such a "suspended" wireless sensor can be reactivated at a later point in time.

7.4.5.3 wireless sensor configuration

The input screen for the configuration of a wireless sensor is called up via the tool symbol to the left of the sensor ID. The input screen is divided into the following sections:

- Naming and enabling of the wireless sensor
  - Alarm messages
  - Measured values (transmission interval and resolution)
  - Defrosting and temperature regulation
  - Delete the archive

Detailed explanations of the individual elements are provided below.

ECKELMANN

7.4.5.4 Naming and enabling of the wireless sensor

Assigning a name and position indicator to a selected wireless sensor:

Sensor Description

Sensor Description

| Name: | Freezer Pizza | Enable: ☑ |
| Pos.: | *001* | Caution: A sensor which is not **enabled** does not communicate with the WR 400 and therefore does not record any data. Setpoints remain unchanged. |

SUBMIT

- Enter the name
  (maximum of 19 alphanumerical characters, no special characters apart from "ß" and the umlauts ä, ö, ü)

- Enter the position number
  (maximum of 5 alphanumerical characters, no special characters)

- Remove the check mark in the enable box if you do not want the receiver module to search for the wireless sensor and record measured data. As standard enable is activated
  (see tips on the theme "Enable" below).

- Confirm the changes using the "SUBMIT" button.

Praxis tips:

Only enabled wireless sensors are permitted to send data to the receiver module. In the following cases a deactivation of the enable is recommended:

- The configuration of the wireless sensors is to be completed before the first data is recorded

- As an alternative to the irrevocable deletion of a wireless sensor (resulting in the permanent deletion of all of its configuration and archive data). The archive data is retained and the wireless sensor can be reactivated at a later date.

7.4.5.5 Alarms and messages

The following alarm messages can be configured for every wireless sensor. An alarm priority is specified for each alarm message. Only alarm messages with the priorities 1 to 99 appear in the alarm list. Alarms with the priority 0 are only saved to the store computer's message list. The option "--" results in the corresponding alarm being ignored.

The following elements can be selected:

- **Temperature Too High:** Exceeding of a temperature limit value in °C for a specific time in minutes.
- **Temperature Too Low:** Shortfall relative to a temperature limit value in °C for a specific time in minutes.
- **Sensor Offline:** Maximum duration in minutes for which a wireless sensor is permitted to remain out of contact with the receiver module.
- **Sensor Error**
- **Low Battery**

Alarms and Messages

Alarms and Messages

Temperature Too High

If the temperature exceeds [-18] °C
for more than [5] min.
then
◉ send a prio [2] alarm.
○ send a message to CI (Prio = 0).
○ ignore it (Prio = --).

Temperature Too Low

If the temperature is below [-20.0] °C
for more than [5] min.
then
◉ send a prio [1] alarm.
○ send a message to CI (Prio = 0).
○ ignore it (Prio = --).

Sensor Offline

If no radio signal is received from this sensor for more than [1] min.
then
○ send a prio [2] alarm.
◉ send a message to CI (Prio = 0).
○ ignore it (Prio = --).

Sensor Error

If the temperature measuring device is defective, then
○ send a prio [2] alarm.
◉ send a message to CI (Prio = 0).
○ ignore it (Prio = --).

Low Battery

If the battery of this sensor is low, then
○ send a prio [2] alarm.
◉ send a message to CI (Prio = 0).
○ ignore it (Prio = --).

SUBMIT

- Temperatures must be entered with a point as the decimal separator (e.g. 18.5 °C).
- Confirm the changes using the "SUBMIT" button.

☞ High and low temperature limits must be within the measuring range of the wireless sensor, i.e. between -40°C and +80°C.

For further information on the TS 30 W/XW's alarm messages see chapter 8.1.7.

ECKELMANN

7.4.5.6 Temperature samples

A reduction of the transmission interval to a value < 15 minutes has an effect on the lifetime of the wireless sensor's battery. It is recommended to keep the standard values.

Temperature Samples

Temperature Samples

CAUTION: Changing these parameters might affect the battery service-life!

Send Cycle (Default: 15 min.)

Measured values shall be transmitted every [15 ▼] min. .
(Note: Sampling interval and storage cycle are both unaffected by change of the transmission interval.)

Resolution (Default: 0.25 Kelvin)

Temperature values shall be measured with a resolution of [0.250 ▼] K .
This parameter gives the minimum difference between two temperature values (e.g. if resolution is 0.5K, values like 12.5°C, 12.0°C and 13.5°C are possible, but 12.2°C is not.

[SUBMIT]

- Select the desired transmission interval and measurement resolution from the drop down menus.
- Confirm the changes using the "SUBMIT" button.

☞ The transmission interval is not identical with the measurement and recording interval which is set to 5 minutes factory-side. A greater transmission interval increases the lifetime of the battery.

7.4.5.7 Defrosting and temperature regulation

Fixed defrost times can be specified for each refrigeration point in order to prevent high temperature alarms being triggered by a defrost.

In addition, an automatic defrost recognition option is available based on the characteristic temperature profile of defrost events. For more information see also chapter 4.2.7.

Defrost and Temperature Control

Defrost and Temperature Control

If defrosting is taking place at the measuring point of the sensor, the WR 400 shall realise this and suppress all high-temperature alarms during defrost.

- ○ **No,**

  defrost is not to be taken into account for alarming.

- ○ **Yes,**

  This WR 400 is connected to an E*LDS case controller (UA 300 or UA 400) via CAN bus, which is responsible for temperature control at the measuring point.

  CAN address of case controller: [0] (1 - 99)

  case zone no.: [0] (1 - 10)

  temperature setpoint at measuring point: [0] °C (-40°C .. +40°C)

- ○ **Yes,**

  defrost starts regularly on

  [▼] at [00] :[00] o'clock and

  [▼] at [00] :[00] o'clock and

  [▼] at [00] :[00] o'clock.

  Defrosting never takes longer than [90] min.

- ○ **Yes,**

  defrost times are not regular and shall be detected automatically.

  Temperature Slope: [1.5 ▼] K.

  [SUBMIT]

- Selection of the desired method for the defrost recognition, and if required, the configuration of the times

- Confirm the changes using the "SUBMIT" button.

ECKELMANN

7.4.5.8 Deletion of the archive

Deleted archive data cannot be restored!

At the end of the page for the configuration of a wireless sensor there is an option for deleting its archive data.

Archive

Archive

For deletion of archive data of sensor id 1 Please confirm with password: [＿＿＿＿＿]

[DELETE ARCHIVE]

In order to delete the archive the "DELETE ARCHIVE" button must be pressed.

In order to prevent an accidental deletion of the archive data the deletion must be authorised by entering the password.

7.4.6 Alarm notifier

The service program "Alarm Notifier" in the Windows menu bar is an addition to the receiver module's web front-end. It alerts the user to receiver module alarms by means of a pop-up window and an alarm tone.

WR 400 Alarm Notifier

File   Tools   ?

Alarm WR 400

Thu Feb 23 11:01:00 2012

[Alarm off]

Open WR 400 web interface
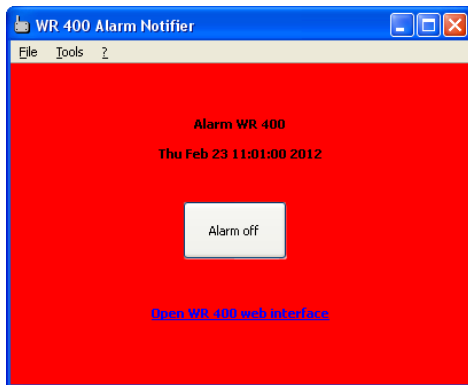
Detailed explanations of the "Alarm Notifier" are provided in its instruction manual.

ECKELMANN

Notice:

8   Menu of WR 300 / WR 400

8.1   Menu tree

Level 1	Level 2	Level 3	Screen No.	Screen Name
Main menu			0	WR300
Overview			1	OVERVIEW
	Summary		1-1	Summary
	Sensor State		1-2	STATE
	Ofline		1-3	OFFLINE
Sensors			2	SENSOR
	Act. Values		2-1	ISTWERTE
		Additional Info →	2-1-a	ADD. INFO *
	Setpoints		2-2	SETPOINTS
		Mode	2-2-1	ACTIVE
		Refrigeration Pnt	2-2-2	REFRIG. POINT
		Alarm	2-2-3	ALARM SENSOR
		Sensor Info	2-2-4	SENSOR INFO
	Manual Shutoff		2-3	SWITCH OFF
	Archive **		2-4	ARCHIVE **
	Delete Sensor		2-5	DELETE!
Clock	Current time		3	CLOCK
Messages			4	MELDUNGEN
	View		4-1	MESSAGES
	Acknowledge		4-2	MESSAGES
	Delete		4-3	MESSAGES
New Sensors			5	NEW SENSORS
		Find	5-1	SCAN MODE
		List	5-2	NEW SENSORS
		Options	5-3	OPTIONS
Configuration			6	CONFIGURAT
	Conf.WR300		6-1	CONF.WR300
	Language		6-2	LANGUAGE
	Alarm-Priorities		6-3	ALARMPRIOS
	Alarm-Relays		6-4	RELAYS

* Only visible in Superuser mode   ** Only in stand-alone operation (WR 400)

8.1.1   Menu 0 Main menu

WR300 POS.: XXXXX	
1 Overview	Move to screen 1
2 Sensors	Move to screen 2
3 Clock	Move to screen 3
4 Messages	Move to screen 4
5 New Sensors	Move to screen 5
6 Configuration	Move to screen 6

8.1.2   Menu 1 Overview

OVERVIEW XXXXX	
1 Summary	Move to screen 1-1
2 Sensor State	Move to screen 1-2
3 Offline	Move to screen 1-3

• Menu 1-1 Summary

SAMMARY		Example:
Sensors = XXX	Total number of sensors assigned to the receiver module	e.g. 60 *
Active = XXX	Number of sensors currently in radio contact with the receiver module	e.g. 55 *
Offline = XXX	Number of sensors where there is currently no radio contact *	e.g. 2 *

☞ * The sum of the active and the failed sensors should equal the total number of sensors within the network:
Example: 55 + 2 = 57   Difference to the total number 60 is -3.
If this figure differs from the total number then the remaining sensors are either in the registration phase or have been switched off (see menu 1-2)!

• Menu 1-2 Sensor State

STATE ID XXX	
Name	Name of the sensor (max. 19 characters)
POS.:XXXXX * XX.XX°C	Sensor position indicator and the last transmitted temperature * = defrost recognised

Status* XXX **	* Sensor operating status
	    Registration
	    Active
	    Failed
	    Deactivated
	** Signal strength during the last radio contact with the sensor
	    +++ very good
	    ++ good
	    + medium
	    - weak
	    -- very weak reception

- Menu 1-3 Offline

Lists all the sensors that **currently have no** radio contact with the receiver.

OFFLINE ID XXX	
Name	Name of the sensor (max. 19 characters)
POS.: XXXXX hh:mm	Sensor position indicator and time of the last contact
SNr.: XXXXXXXX	Serial number of the sensor

8.1.3   Menu 2 Sensors

SENSOR ID XXX	
Name	Name of the sensor (max. 19 characters) Factory settings: TS30W with ID XXX
POS:XXXXX * XX.XX°C	Sensor position indicator and the last transmitted temperature value * = defrost recognised
SNo.: XXXXXXXX	Serial number of the sensor

The selection of the desired sensor is either carried out by entering its sensor ID and
then confirming with the ENTER key (↵) or the cursor buttons (↑, ↓):
The following menu appears after pressing the ENTER key (↵):

SENSOR ID XXX	
1 Act. Values	Move to screen 2-1
2 Setpoints	Move to screen 2-2
3 Manual Shutoff	Move to screen 2-3
4 Archive	Move to screen 2-4 (only in stand-alone operation (WR 400)
5 Delete Sensor	Move to screen 2-5

- Menu 2-1 Actual Values

ACT VALUES ID XXX	
Temperature: XX.X°C	Last temperature value transmitted by the sensor
t: hh:mm dd.mm.YYYY	Time of the last data transmission
State	Current operating status (operational / offline / deactivated)
Additional Info →	Move to screen 2-1-a (shown only when Superuser mode is activated)

• Screen 2-1-a Additional information on the sensor connection data

👉 This menu only appears when the Superuser mode is active (see Operation chapter).

ADD.INFO ID XXX	
SNo.: XXXXXXXX	Serial number of the sensor
A hh:mm dd:mm:yyyy	Time and date of the first radio contact with the sensor
E hh:mm dd:mm:yyyy	Time and date of the last radio contact with the senso
Failures XXXXX	Number of radio contact losses (e.g. due to poor wireless connection)
Packages XXXXX	Number of packets received from the sensor
RSSI: -XXX	Strength of the radio signal from the sensor in dBm
Battery: XXXXX	Sensor battery status: OK / low
Z: hh:mm dd:mm:yyyy	Time of the last transmission of the sensor count value
request EIN/AUS	ON: request counter value during next transmission
SCAN Cycl. X	Number of sensor scan cycles
Measures X	Number of temperature measurements conducted (every 5 minutes during operation)
NACKs X	Number of unconfirmed transmissions
Sent X	Number of data packets transmitted

• Menu 2-2 Setpoints

SETPOINTS ID XXX	
1 Mode	Move to screen 2-2-1
2 Refrigeration Pnt	Move to screen 2-2-2
3 Alarm	Move to screen 2-2-3
4 Sensor Info	Move to screen 2-2-4

• Menu 2-2-1 Mode

ACTIVE ID XXX		Entry	Default
Transmission interval XX min	Transmission interval at which the sensor transmits new data	5/10/15/20/30	15 min.
Resolution X.XX K	Resolution of the temperature value	0.1/0.2/ 0.25/0.5	0.25 K
Position fix X	Sensor is fixed in its intended position (e.g. screwed)	↑, ↓, (Y/N)	Y
Cleaning Mode XXX	Service mode ON/OFF for the wireless sensor	ON/OFF	OFF

👉 As soon as the wireless sensor is installed in its intended position and no longer moves from this location, an automatic adjustment of the transmitter power is conducted for an optimal battery lifetime.
During the period in which a wireless sensor is in service mode no failure alarms or temperature alarms are generated for the wireless sensor and existing alarms are reset. This is of use e.g. for refrigerated display cases which are turned off over night or for cleaning.

• Menu 2-2-2 Refrigeration Pnt

REFRIG. POINT ID XXX		Entry	Default
Case Contrl.: XXXXX	Selection of the case controller deployed at the location of the sensor: UA: Case controller of the LDS system other: Case controller of a third party system	UA/other	UA

☞ For further details on defrost recognition see chapter 4.2.7.

Menu 2-2-2, if the controller type "*UA*" is selected:

REFRIG. POINT ID XXX		Entry	Default
Case Contrl.: UA	Selected: Case controller of the LDS system	UA	
UA Nd. No: XX	CAN bus address (node number) of the case controller assigned to the wireless sensor (UA)	--, 1..99	--
Zone No.: XX	UA controller zone	--, 1..10	--
Setpoint XXX	Temperature setpoint for the setpoint adjustment function for case controllers (UA 300 / UA 400)	--, -45..45	--

Menu 2-2-2, if the controller type "*other*" is selected:

REFRIG. POINT ID XXX		Entry	Default
Case Contrl.: other	Selected: Case controller of a third party system	other	
Defr.detect.: XXXX	Selection of the type of defrost recognition: none: no defrost / no defrost recognition Timer: defrost recognition according to defrost clock autom: automatic defrost recognition	none/Timer/ autom.	none

Menu 2-2-2, if the controller type "*other*" and "*Defr.detect.*: none" is selected:

REFRIG. POINT ID XXX		Entry	Default
Case Contrl.: other	Selected: Case controller of a third party system	other	
Defr.detect.: none	none: no defrost / no defrost recognition	none	

Menu 2-2-2, if the controller type "*other*" and "*Defr.detect.*: Timer" is selected:

REFRIG. POINT ID XXX		Entry	Default
Case Contrl.: other	Selected: Case controller of a third party system	other	
Defr.detect.: Timer	Timer: Defrost recognition according to defrost clock	Timer	
START: hh:mm	Start time for the defrost (max. 3 start times possible) Entry of a day, i.e. series of days and a time	Mo ..Su Mo-Su, Mo-Fr Mo-Sa, Sa-Su	--
START: hh:mm			
START: hh:mm			
Duration xxx m	Max. duration of the defrost (during the defrost no temperature alarms are generated)	10..240	90 min

Menu 2-2-2, if the controller type "*other*" and "*Defr.detect.*: autom" is selected:

REFRIG. POINT ID XXX		Entry	Default
Case Contrl.: other	Selected: Case controller of a third party system	other	
Defr.detect.: autom.	Autom: automatic defrost recognition	autom.	
Defr.type unknown	Selection of the defrost type: el/HG/D2D electric, hot gas or D2D Defrost Air circulation: with air circulation defrost Unknown: when it is not known which type of defrost is employed, i.e. the temperature difference is to be configured manually.	el/HG/D2D off-cycle unknown	unknown
TmpDiff: X.X K	Only visible when defrost type = unknown Temperature difference relevant for the triggering of the defrost recognition, small values: high sensitivity (the defrost recognition routine is started even with a small temperature difference) large values: low sensitivity (the defrost recognition routine is only started with large temperature differences)	0.5..5.0	1,5K

• Menu 2-2-3 Alarm

ALARM SENSOR ID XXX		Entry	Default
Setp. Hi Temp XXX.X°C	High temperature setpoint at which the high temperature alarm is triggered.	-40..+80	+30 °C
Delay Hi Temp XXXm	Message delay in the event of high temperature	0..240	90 min.
Prio Hi Temp. XX	Priority for a high temperature alarm	--,0..99	1
Setp. Lo Temp XXX.X°C	Low temperature setpoint at which the low temperature alarm is triggered.	-40..+80	-30 °C
Delay Lo Temp XXXm	Message delay in the event of low temperature	0..240	90 min.
Prio Lo Temp. X	Priority for a low temperature alarm	--,0..99	1
Prio Offline XX	Priority for a failed sensor	--,0..99	0
Delay Off XXXm	Message delay in the event of sensor failure	0..120	60 min.
Prio Batt.Low XX	Priority for sensor message "Battery voltage"	--,0..99	0
PrioSnsrFault XX	Priority for sensor message "Sensor failure"	--,0..99	0

• Menu 2-2-4 Sensor Info

SENSOR INFO ID XXX		Entry	Default
Name XXXXXXXXXX	Name of the sensor (max. 19 characters): A meaningful name should be entered providing details on the position of the sensor, e.g. Cheese Counter 2	Text	
POS.: XXXXX	Sensor job title (max. 5 characters), e.g. KT2		Sensor ID
SNo.: XXXXXXXX	The serial number provides a unique identification of the sensor and cannot be changed.	--	XXXXXXXX
Version X.XX	Sensor software version	--	X.XX
Enable X	If the enable is withdrawn, then the wireless sensor is returned to the enable list (menu 5-2)	↑, ↓, (Y/N)	Y

• Menu 2-3 Manual Shutoff

The sensor can be switched to the energy saving mode via the manual shutdown. The temperatures recorded during a limited shutdown period are saved in the sensor and transmitted to the receiver module at the end of this period.

SWITCH OFF ID XXX		Entry	Default
Mode: XXXXXXXX	Period for which the sensor is to be shut down, i.e. deep sleep mode from which the sensor can only be awoken using the magnet.*	xh / xd/ Shut Down*	Shut Down
switch off now X	Initiate the shutdown of the sensor Y/N *	↑, ↓, (Y/N)	Initiate shut-down with confirmation prompt

☞ * The sensor is put to "sleep" via the parameter *Mode*, plus the interval period (see menu 2-2-1). If the sensor is put to sleep using this procedure, it can **only** be reactivated before the end of this period using the magnet (see chapter 5.2.10 - Activation of Sensors).

• Menu 2-4 Archive

This function is only available in stand alone operation (WR 400).

• Menu 2-5 Delete Sensor

When deleted, all of the sensor's configuration data is lost!
The deletion of a sensor is only advisable when it is to be either permanently removed from the receiver module network, or the sensor is not to be assigned to the receiver module (the sensor is assigned to another receiver module).

DELETE ! ID XXX		Entry
SNo.: XXXX	Serial number of the sensor	↵, ESC
Are you sure ? NO: ESC YES: ↵	Safety prompt for deleting messages; press ESC to exit after confirming or cancelling delete	

☞ If the sensor is not required for a longer period, it is advisable to deactivate the sensor, i.e. put it to "sleep" (see menu 2-3 Manual Shutdown), so that the sensor configuration and archive are retained.

8.1.4 Menu 3 Clock

☞ When connected to the CAN bus, the default time is provided via the time master (e.g. CI 3000). In this case entries are overwritten by the default value.

CLOCK POS: XXXXX		Entry	Default
Date: XX dd.mm.yy	Display and enter* current weekday, date	dd.mm.yy	
Time: hh:mm	Display and entry* of current time	hh:mm	
Daylight Saving X	Display and entry* of automatic daylight saving time change (Y/N)	↑, ↓, (Y/N)	Y

* Input only possible in stand-alone operation (WR 400)

8.1.5 Menu 4 Messages

MESSAGES POS: XXXXX	
1 View	Move to screen 4-1 View Messages
2 Acknowledge	Messages in log are cancelled, press ESC to exit after cancel is confirmed
3 Delete	Move to screen 4-3

• Menu 4-1 View Messages

MESSAGES	PRIO: XX	
Error text 1:		Fault message Fault 1
dd.mm.yy hh:mm	ON	Start of Fault 1
dd.mm.yy hh:mm	OFF	End of Fault 1 (only when Fault 1 has ended)
...		
Error text n:		Fault message Fault n
dd.mm.yy hh:mm	ON	Start of Fault n
dd.mm.yy hh:mm	OFF	End of Fault n (only when Fault n has ended)

• Menu 4-2 Cancel Messages

This diplays the *Alarms Cancelled!* message.

• Menu 4-3 Delete Messages

MESSAGES	POS: XXXXX		Entry
Delete ! Are you sure ? NO: ESC	YES: ↵	Safety prompt for deleting messages; press ESC to exit after confirming or cancelling delete	↵, ESC

8.1.6 Menu 5 New Sensors

NEW SENSORS	
1 Scan Mode	Move to screen 5-1
2 List	Move to screen 5-2
3 Options	Move to screen 5-3

• Menu 5-1 Find (new sensors)

SCAN MODE			Entry	Default
START	√	After pressing Y the search mode is activated, a check mark (√) appears in the display.	Y, ESC	

The receiver module now searches for sensors within range (SCAN LED flashes).

If sensors are found, depending on the configuration of the parameter *Auto Enable* (menu 5-3), they are added to the list of new sensors (menu 5-2) or enabled sensors (menu 2).

Following this the search must be terminated again. Open the screen again and terminate the search with ENTER (↵).

The following screen appears:

SCAN MODE		Entry	Default
Started at hh:mm	The search mode was activated at hh:mm	Y, ESC	
STOP SCAN √	After entering Y again the search mode is deactivated, a check mark (√) appears in the display.		

- Menu 5-2 List of new ensors

☞ This list contains all the sensors found by the receiver module during its search, but which have **not** been released for the network.
The wireless sensors can be released for the network by pressing the ENTER key (↵).

NEW SENSORS ID: XXX		Entry	Default
SNo.: XXXXX ↑	Serial number of the sensors found / to be found: the sensors can be scrolled using and . **Important**: The last page in the screen is empty (serial number XXXXX) so that a sensor can be entered manually on the basis of its serial number. Tip: By pressing "0" and ↵ you can jump immediately to this part of the screen.	↑, ↓,	
configure →	Sensor configuration	move to screen 5-2-a	
enable: X	The wireless sensor is enabled for the wireless network by pressing ↵, A √ erscheint im Display. appears. **Important**: After exiting this screen by pressing ESC all sensors marked with a are deleted from this screen and automatically added to the list of enabled sensors (menu 2).	Y	

- Menu 5-2-a Sensor configuration

SETPOINTS ID: XXX		Entry	Default
SNo.: XXXXX	Serial number of the sensors found / to be found	--	
Name XXXXXXXXXX	Name of the sensor (max. 19 characters): A meaningful name should be entered which provides details on the position of the sensor, e.g. Cheese Counter 2	Text	--
Position: XXXXX	Sensor position indicator (max. 5 characters), e.g. NT2	Text	Sensor ID

- Menu 5-3 Options

OPTIONS		Entry	Default
Auto Enable	ON: the sensors found in the search mode (menu 5-1) are automatically released. OFF: the sensors found in the search mode (menu 5-1) are added to the list of new sensors (menu 5-2) and must be manually enabled (menu 5-2 or LDSWin).	↑, ↓, ON/OFF	ON

8.1.7 Menu 6 Configuration

CONFIGURAT	
1 Receiver Module	Move to screen 6-1
2 Language	Move to screen 6-2
3 Alarm-Priorities	Move to screen 6-3
4 Alarm-Relays	Move to screen 6-4

• Menu 6-1 RF Receiver (RF = radio frequency)

RF MODULE ID XXX		Entry	Default
Receiver name: WR300...	Name of the receiver (max. 19 characters): A meaningful name should be entered which provides details on the position of the receiver module, e.g. Receiver Module WR1	Text	WR300
Position: XXXXX	Sensor position indicator (max. 5 characters), e.g. WR1	Text	CAN bus address *
Priority: XX	Alarm priority in the event of receiver module failure (see also menu 6-3)	↑, ↓, 1..99	
No. Sensors XX	Indication of the connected sensors	--	
Battery okay? X	Indication of the receiver module battery voltage: Y (battery full) / N (battery weak) (only with stand-alone variant of the receiver module)	--	
IP: 192.168.161.001	IP address for the receiver module (WR 400 only)	↑, ↓, 0.0.0.0 .. 255.255.255.255	192.168.161.2
Sub:255.255.255.000	Subnet mask for the receiver module (WR 400 only)	↑, ↓, 0.0.0.0 .. 255.255.255.255	255.255.255.0
Tempal.if offl.	Only visible in Superuser mode: If the parameter is set to No, then in the event of a sensor failure no alarm signals for high temperatures are generated (appropriate when e.g. during a defrost the sensor no longer has contact with the receiver).	Y/N	Y
Receiver ID XXX	Only visible in Superuser mode: Network address of the receiver module in the wireless network (this does NOT refer to the CAN bus address!)	10..120	101 .. 104 (depending on the CAN bus selector switch)

⚠️ When more than one receiver module is within range, i.e. or when sensors are within range of several receiver modules, it is **essential** to ensure that the receiver modules have **different IDs** (between 10 and 120), otherwise the correct assignment of the data cannot be guaranteed.
As long as all the receiver modules are within the same CAN network, this danger does not exist as devices with different CAN addresses automatically receive different network addresses.

☞ **Praxis tip**: For simplification and ease of identification, a unique position indicator (POS) should be used for each receiver module.

• Menu 6-2 Language

The value is selected in accordance with the entry. The check mark indicates the current setting.

LANGUAGE POS: XXXXX		Entry	Default
Deutsch D √		↵	√
English GB		↵	
Francais F		↵	

• Menu 6-3 Alarm-Priorities

ALARMPRIOS POS: XXXXX		Entry	Default
Following parameters are only shown when refrigeration point priority is set to N. Meaning of vaild entries for alarm priority is as follows: - = Event ignored 0 = Message (entered only in message log) 1 = Priority 1 alarm .. 99 = Priority 99 alarm			
Power Failure	Restart of receiver module following power failure	-, 0..99	0
First Start	Controller Startup (basic settings are loaded!)	-, 0..99	1
Hardware Fault	The internal hardware of the receiver module is defect. Priority is given to the messages *EEPROM Defective, RTC Defective, Flash Memory Defective and Radio unit Defective*	-, 0..99	1
Setpoint Change	Message is generated during changing setpoints	0..99	0
Battery Voltage	Battery voltage is too low.	-, 0..99	0
Manual Shutoff	The sensor has been deactivated via the manual shutoff (menu 2-3).	-, 0..99	1

• Menu 6-4 Alarm-Relay

RELAYS POS: XXXXX		Entry	Default

inverted X	Inversion of the relays PRIO1/PRIO2/AUX:
	(Can only be configured in Superuser mode)
	Y: Alarms active = relays drop out (Zero potential
	    receiver module generates alarm signal)
	N: Alarms active = relays activated
	    (Alarm signal generation only possible under voltage)
		Y/N	Y

For more information on the alarm relays see chapter 4.1.6.1.

9 Decommissioning and disposal

9.1 Decommissioning / Demounting

The disassembly of the equipment is only to be carried out by trained and authorised personnel.

Warning - hazardous electrical voltage!
Danger of electric shock! During disassembly the same safety instructions and hazard warnings are to be observed as in the case of installation, commissioning and maintenance, see chapter 1, "Industrial safety notes".

During disassembly the reverse procedure is to be observed as that during assembly, see chapter "Installation and Startup".

9.2 Disposal

The scope of our delivery is designated as a component exclusively for further processing.

As a consequence of this fact, Eckelmann AG does not undertake any measures for the taking back or munici-pal recycling of this product as it is not supplied directly to the free market.

Never dispose of this product with other household waste. Please inform yourself of the local regula-tions for the separate disposal of electrical and electronic products. The correct disposal of your old equipment will protect people and the environment from possible negative effects.

The provisions and regulations for the disposal of the equipment are to be observed.
In accordance with the contractual agreement, the customer is beholden to dispose of electrical and electronic waste in compliance with the statutory regulations based on the Directive 2002/96/EC on waste electrical and electronic equipment.

ECKELMANN

Notice:

10 Alarms and Messages of WR 300 / WR 400

The following table contains all the text messages from receiver module and wireless sensors and their possible cause. Each text message has a priority which can be set in the screen Alarm Priorities (menu 6-3).

Receiver module

No.	Message	Cause	Correction
Hardware faults			
4	EEPROM Fault	The EEPROM defective	Please contact Service Organization - Replace device
6	Flash Fault	Flash memory module defective	Please contact Service Organization - Replace device
8	RTC Fault	Real-time clock defective	Please contact Service Organization - Replace device
10	Battery voltage (only WR 400)	The battery for the real-time clock is dead.	Replace the battery (see chapter 5.4 Maintenance and Battery Change)
18	Radio unit defect	Receiver module radio unit is defect	Please contact Service Organization - Replace device
50	First Start	The receiver module has conducted a First Start (loading of the basic settings)	--
51	Power Failure	Controller performed restart after power outage	Check 230 V power supply

Wireless sensors

No.	Message	Cause	Correction
Messages			
10	Low battery IDXXX	The battery from the wireless sensor with the identification number XXX is flat	Replace the wireless sensor as it is not designed for a battery change!
128	Sensor fault ID XXX	The sensor does not supply any plausible values	Please contact Service Organization - Replace device
132	Temp. too hi ID XXX	The measured value is greater than the set high temperature limit	Check parameterisation, sensors, equipment
133	Temp. too low ID XXX	The value measured is lower than the set low temperature limit	Check parameterisation, sensors, equipment
187	Manual off! ID XXX	Sensor xxx has been switched off for a limited time period	Activation **before** the end of this period possible using magnet, see chapter 5.2.10
	Manual off! ID XXX	Sensor xxx has been put into deep sleep!	Activation **only** possible using magnet, see chapter 5.2.10
240	Setpointchange	A setpoint has been changed	--
243	Sensor OFF ID XXX	The sensor currently has no radio contact with the receiver module	Check sensors, signal quality

10.1 Alarms

High or low temperature alarm

Alarm is generated due to high or low temperature if the set time delay has expired (menu 2-2-3).

Alarm suppression during defrosting

In order to prevent a high temperature alarm being triggered during the defrosting of a refrigerated display case, parameters for the defrost recognition can be set for every sensor via menu 2-2-2. For further information see chapter 4.2.7.

Individual allocation of priorities

It is possible to set individual priorities for the majority of alarms. This enables the targeted triggering of alarm destinations and the adjustment of alarm signalling to individual requirements.

The value range for the priorities is 0..99 so that up to 99 alarm destinations can be selected. The respective alarms (exception: global priorities and setpoint adjustment) can also be set to the value "-" and thus completely eliminated from the alarm signalling.

Alarm signalling routes

When an alarm state is detected, it is transmitted by the following routes:

- CAN bus at system centre / store computer (E*LDS System)
- Alarm relay (zero potential changeover contacts)

Termination of alarm

After the cause has been eliminated the alarm is automatically reset.

10.2 Messages

States constituting abnormal working conditions but not an alarm state are reported via the interfaces and recorded in the store computer's message list.

A maximum of 50 alarms and messages (PRIO 1..99) with date and time for raised and cleared are recorded in the receiver module's message list (menu 4-1). These are stored in a circular buffer. If the circular buffer is full, the oldest message is deleted with each new entry.

10.3 Transient alarms and messages

Transient alarms are alarms for single events and are not provided with a cleared time stamp. Due to this characteristic, transient alarms are not automatically deleted after the alarm event, instead they must be manually acknowledged.

The following alarms are transient alarms:

- Setpoint adjustment
- Manual shutdown
- Power failure

11 Specifications of WR 300 / WR 400 / TS 30 W

11.1 Electrical data

Warning - hazardous electrical voltage!
Danger of electric shock! Overvoltage category III / pollution degree 2:
All device connections designed for use with 230 V AC supply voltage
must be connected to the same phase conductor.
400 V AC between neighbouring connection terminals is **not** permitted!

Overvoltage category II / pollution degree 2 or
Overvoltage category II / pollution degree 1:
Different phase conductors may be used.
400 V AC between neighbouring connection terminals is permitted!

	WR 300 / WR 400
Electrical Data	
Power supply	230 V AC (+/- 10 %), 50/60 Hz (+/- 3 Hz)
Rated power	11 VA
Leakage current over PE	max. 1 mA
Digital input	1 x 230 V AC floating
Relay outputs	3 x 230 V AC, 6 A (changeover) floating
Radio frequency	868 MHz
Antennas	2 x antenna terminals with SMA screw connections
Fieldbus port	CAN bus, floating
Interfaces	DISPLAY connection for operator interface of the BT 300 series LAN/Ethernet* WR 400 only - for integration in a network (MAC address: See rating plate)
USB interface	For firmware update
Data memory*	For data recording of all 100 wireless sensors for 1 year
Realtime clock	Battery-backed, Lithium cell (shelf life 10 years), type CR 2450N, 3 V lithium Accuracy: typically 12 min/yr at 25 5C
Monitoring function	Watchdog
Supply lead	M16

* WR 400 only

	WR 300 / WR 400
Environmental conditions	
Temperature range	Transport: -20 °C ... +80 °C Operation: 0 °C ... +50 °C Storage at low temperatures enhances the battery lifetime.
Temperature change	Transport: max. 20 K/h Operation: max. 10 K/h
Relative humidity (non-condensing)	Transport: 8 % ... 80 % Operation: 20 % ... 80 %
Atmospheric pressure	Transport: 660 hPa ... 1060 hPa Operation: 860 hPa ... 1060 hPa
Weight	ca. 680 g
Enclosure	IP20 ⚠ The receiver module may only be operated in heated or air conditioned rooms.
CE conformity	2002/95/EG (RoHS) 2004/108/EG (EMC Directive) 2006/95/EG (Low Voltage Directive)

11.2 Electrical data TS 30 W / TS 30 XW

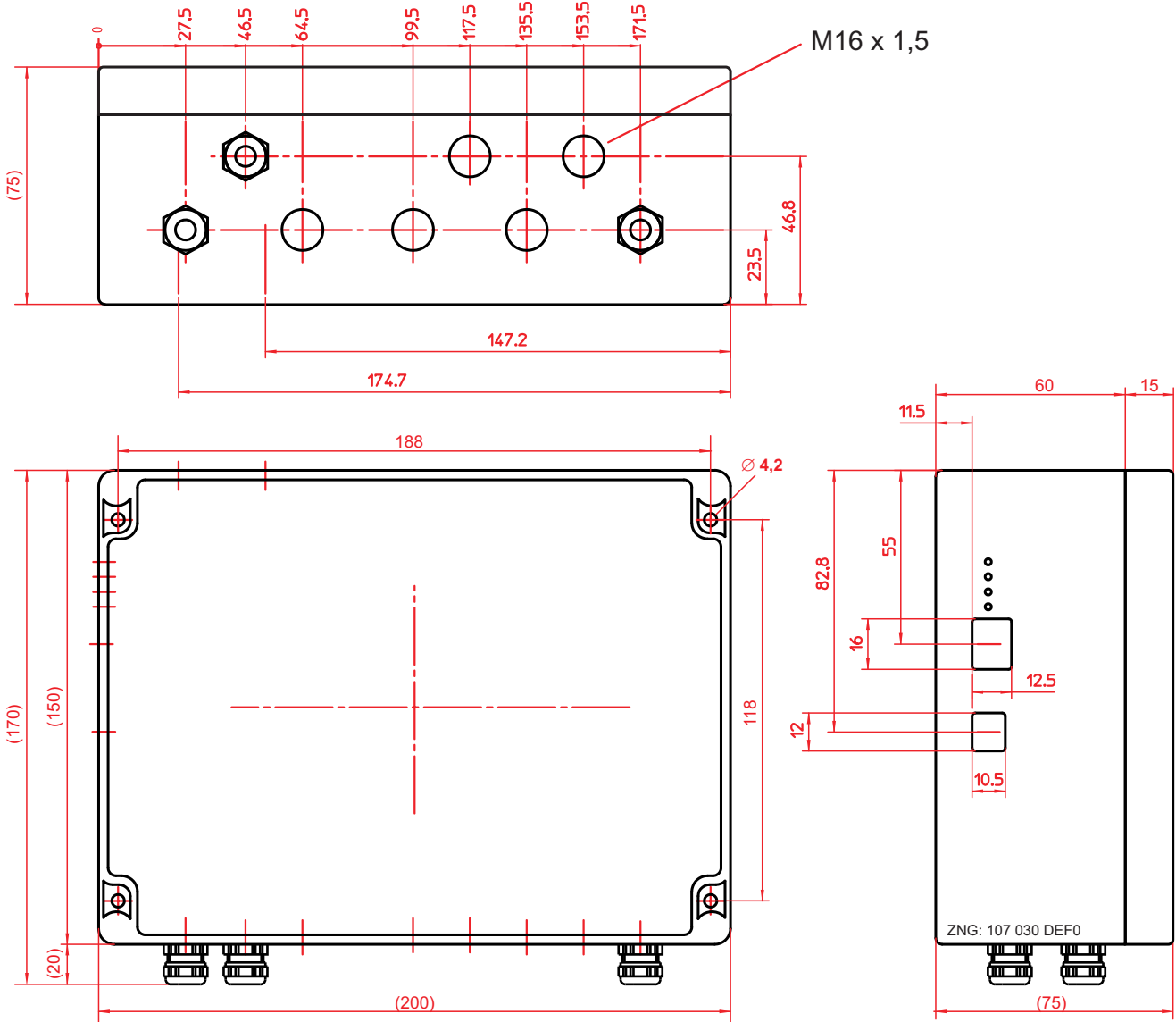|	TS 30 W / TS 30 XW
Electrical Data	
Power supply	Internal battery (no battery change provided) Live time in standard operation: 10 years (see chapter 4.2.5).
Radio frequency	868 MHz
Operating distance	Up to 80 m e.g. open air and in factory halls (see chapter 5.1.1)
Measurement range	-40 °C ... +80 °C Resolution: 0,1 .. 1 K (standard: 0,25 K) Accuracy: typical ± 0,1 K, max. ± 0,5 K (-40 .. +50 °C)
Supply lead	TS 30 XW only: cable lenght for external sensor: 3,0 m
Activate function	Via integrated reed contact located at the centre beneath the upper surface of the casing (see chapter 5.2.10)
Environmental conditions	
Temperature range	Transport and Operation: -40 °C ... +80 °C
Relative humidity (non-condensing)	Transport and Operation: 5 % ... 100 %
Atmospheric pressure	Transport and Operation: 660 hPa ... 1060 hPa
Weight	approx. 56 g
Enclosure	TS 30 W: IP65 TS 30 XW IP62 (wireless sensor housing) IP67 (external temperature sensor at the end of cable)
CE conformity	Conforming to EC Directives 73/23/EEC (Low-Voltage Directive) 89/336/EEC (EMC Directive)

Supplement to standard DIN EN 12830 for temperature recorders	
Type of recorder	
Suitable for storage	S
General requirements	
Measuring range	-40 °C ... +80 °C
Degree of protection provided by the enclosure	WR 300/WR 400: IP 20 TS 30 W: IP65 TS 30 XW: transmission and receiver unit: IP62 / external sensor: IP68
Supply voltage	Battery
Metrological characteristics	
Accuracy class	1
Maximum permissible error	+/- 0,5 K
Resolution	0,1 K
Recording interval	5 min.
Recording duration	WR 300: 1 week WR 400: 1 year
Maximum relative time error	< 0.1 %
Response time	< 10 min.
Type of climatic environment	A

11.3 Mechanical data

Receiver module

Wireless sensors TS 30 W / TS 30 XW
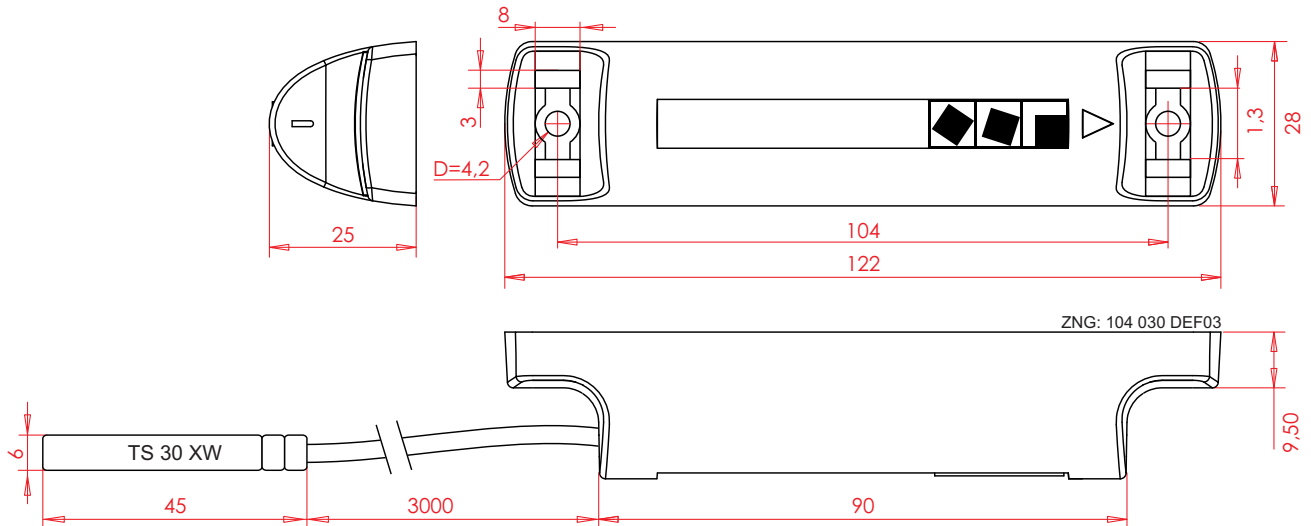
TS 30 XW **only**: with cable (3,0 m) for external temperature sensor (right the transmission and receiver unit TS 30 W / TS 30 XW).

11.4 Information on open source software

uIP is open source software, licensed under the BSD-style license that follows. It basically means "use in any way you wish, just give proper credits by including the copyright notice in the source code and mention it in any documentation or manuals provided with your product".

Copyright (c) 2001-2006, Adam Dunkels and the Swedish Institute of Computer Science

All rights reserved.

ECKELMANN

11.5 Sensor list

Marktet / Object: _____   **Page 1 / _____**

No.	Serial number (see label)		ID	Position indicator (Menu 5-2-a)	Name / function / installation site (Menu 5-2-a)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

Marktet / Object: _____   **Page 2 / ____**

No.	Serial number (see label)		ID	Position indicator (Menu 5-2-a)	Name / function / installation site (Menu 5-2-a)
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					

Marktet / Object: _____   **Page 2 / _____**

No.	Serial number (see label)		ID	Position indicator (Menu 5-2-a)	Name / function / installation site (Menu 5-2-a)
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					

ECKELMANN

Marktet / Object: _____   **Page 4 /** _____

No.	Serial number (see label)		ID	Position indicator (Menu 5-2-a)	Name / function / installation site (Menu 5-2-a)
76					
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98					
99					
100					

Notice:

12 Order No.'s and accessories

12.1 Receiver modules and Wireless sensors

Type	Description	Order number
WR 300	Receiver module WR 300 for monitoring of up to 100 wireless sensors, with CAN Bus. Supplied with two activation magnets and an external antenna	KGLTS30WR1
TS 30 W	Wireless sensor wih **integral** temperature probe (standard)	KGLTS30W01
TS 30 XW	Wireless sensor wih **external** temperature probe	KGLTS30XW1

12.2 Components

Component	Description		Order number
Activation magnet	Activation magnet - *WAKE ME UP* - for acivating wireless sensors from their sleep mode		MAGNWAKEUP
Rod antenna	Rod antenna with SMA connector		ANT868STA1
External antenna	External antenna with SMA connector, 2 m cable		ANT868EM20
Antenna extension	Antenna extension cable für antenna, SMA connector, 5 m cable		ANT868VER1
Power supply cable 230 V AC	Cable for power supply 230 V AC, with grounding plug, 3 x 1 mm^2, lenght 3 m		NKAB103
USB cable	USB cable (Connector A to Connector B) for firmware update		PCZKABUSB1
BT 300 Operator Interface	BT 300 M	Operator Interface handheld operating terminal for customer service with 2,8 m connecting cable	LIBDTUA052
	BT 300 S	Operator Interface for panel mounting	LIBT300S51

Notice: