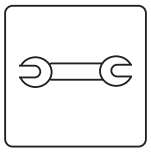
MANUAL

Radio remote control

HANDYcontrol II

General



Installation

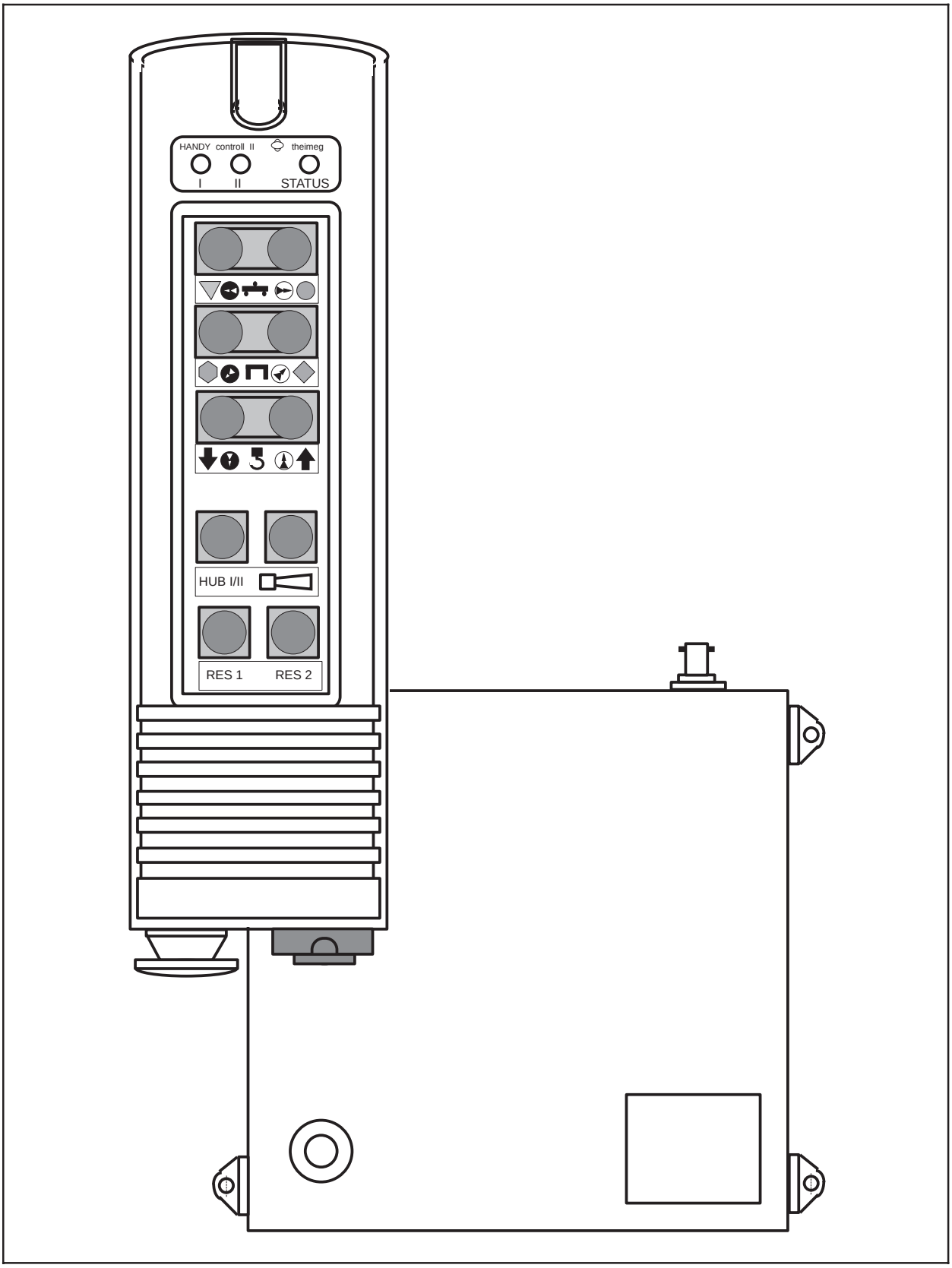
Operation

Fault in the system

Maintenance

Printed matter:	**BED KF/17-HS (3/98 GB)**
Drawing no.:	90.007-434-01
Author:	Siemes
Version:	October 1998

HANDYcontrol II



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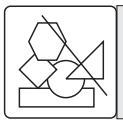
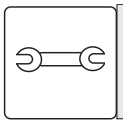


GENERAL Page 1-1 to 1-4



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Operation Page 3-1 to 3-11

Fault in the system Page 4-1 to 4-4

Spare parts and technical data Page 5-1 to 5-9

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GENERAL

1.1 Safety instructions

It is essential to observe the statutory regulations and guidelines applicable for the particular use of the system.
In particular, it is essential to observe the following regulations and guidelines.

Accident prevention regulations

VBG9	Cranes
VBG9a	Load-carrying equipment used as hoists
VBG8	Winches, hoists and drawgear
VBG12a	Industrial trucks
VBG14	Car lifts
VBG40	Diggers, loaders, planers, scrapers and special civil engineering machines

Guidelines and safety regulations

ZH 1/547	Guidelines for radio remote control systems for cranes Guidelines for radio remote control systems for rope winches for Land- und Forstwirtschaft Bundesverband der landwirtschaftlichen Berufsgenossenschaften e.V.
.	
SEB660035	Materials handling technology cranes with wireless control, basic principles and technical safety requirements
SEB660040	Direction of travel marking on crane systems

DIN VDE regulations

DIN VDE 0100

Regulations for installing heavy-duty power installations with nominal voltages up to 1000V.

DIN VDE 0160

Equipping heavy-duty power installations with electronic equipment.
If they are linked to the construction or operation of the overall system, they must also be taken into account.

Comments:

Before the radio remote control system is used in practical applications, all operators must be instructed in handling the equipment, and must familiarise themselves with the system of remote control for the machine and the crane.

Particular care must be observed with the control system during the familiarisation phase.

It is essential to ensure that only one control unit can be used for controlling the system at any one time.

When using the remote control system, it is essential to choose a safe place to stand and ensure that the entire working area can be viewed.

If the radio remote control system is used for cranes and hoists, it is essential to ensure that the load remains in a stable position during travel and that an adequate safety distance is observed.

Technical safety checks and maintenance of the remote control system must be performed and acknowledged as detailed in chapters 3.3.1 to 3.4.

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Warranty and liability:

All warranty and liability is excluded if the system or parts of the system are not installed correctly or damaged, or in the event of inexpert intervention in the system.

This is also applicable if the prescribed checks and maintenance work are not performed by appropriately qualified and instructed personnel.

Explanation of text markings

ATTENTION!

This is used if failure to follow operating instructions, work instructions, prescribed procedures, etc. precisely or at all may result in damage to the equipment.

WARNING!

This is used if failure to follow operating instructions, work instructions or prescribed procedures, etc. precisely or at all can lead to injury or fatal accidents.

NOTE:

This is used to draw attention to ways of making work easier.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user`s authority to operate the equipment.

1.2 Principle behind transmission of commands

In the transmitter, the control commands activated via the command generator are converted into serially coded pulse chains, so-called blocks of information. The signals generated in this way are broadcast via the transmitter antenna via a high-frequency carrier. The receiver evaluates the high-frequency carrier, filters the incoming serial information of the information blocks and reconverts them into parallel commands. The commands are then sent to the downstream control system via output relays.

DIP switches in the transmitter (for TH-KF/17-H) enable the radio remote control system to be configured in accordance with the precise requirements. In receivers with a Harting connector, the potentials can be connected to each other via an internal terminal strip (TH-KF/17-H32K1).

1.3 Addressing / coding

WARNING!

Due to technical safety considerations, the addresses must not be changed mechanically or electrically.

Every system possesses a special address assigned specifically to that system, i.e. this address is not encountered in any other system.
The address is defined and registered by Theimeg, and is coded in address connectors. When several radio remote control systems are operated on one frequency within one particular working area, the address coding facility ensures that signals can be allocated to specific remote control transmitters and remote control receivers.

Redundant and coded transmission is used for the information.

Commands: Hamming distance d=6 by cyclical coding

Addresses: two different codings independent of functions, hamming distance at least d=6 by cyclical coding and d=2 by special code

1.4 Frequency coordination

The operator is responsible for frequency coding, as external overall frequency coding is not possible in the frequency group “F” (frequency range 433.100 to 434.750 MHz).

1.4.1 Several systems in frequency group “F”

If several remote control systems are to be used on the same frequency in this frequency group, it is essential to ensure that there is adequate spacing between the various systems. As a guideline, the user’s own transmitter must always be at least 80m closer to its own receiver than an external transmitter on the same frequency.

The required spacing also depends on the local conditions, e.g. steel walls may have a screening effect in an adjacent hall or high reflections might increase the required spacing.

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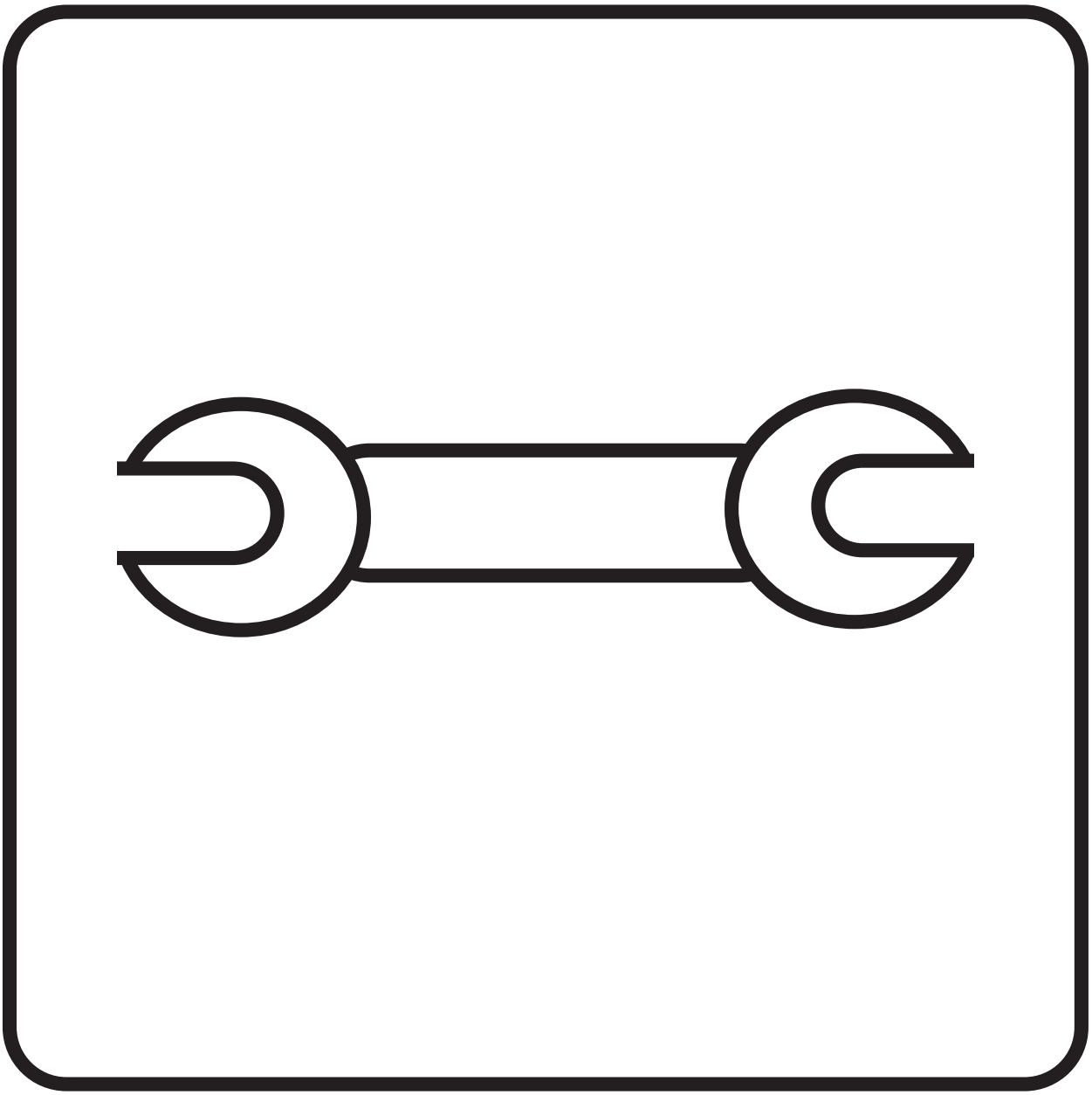

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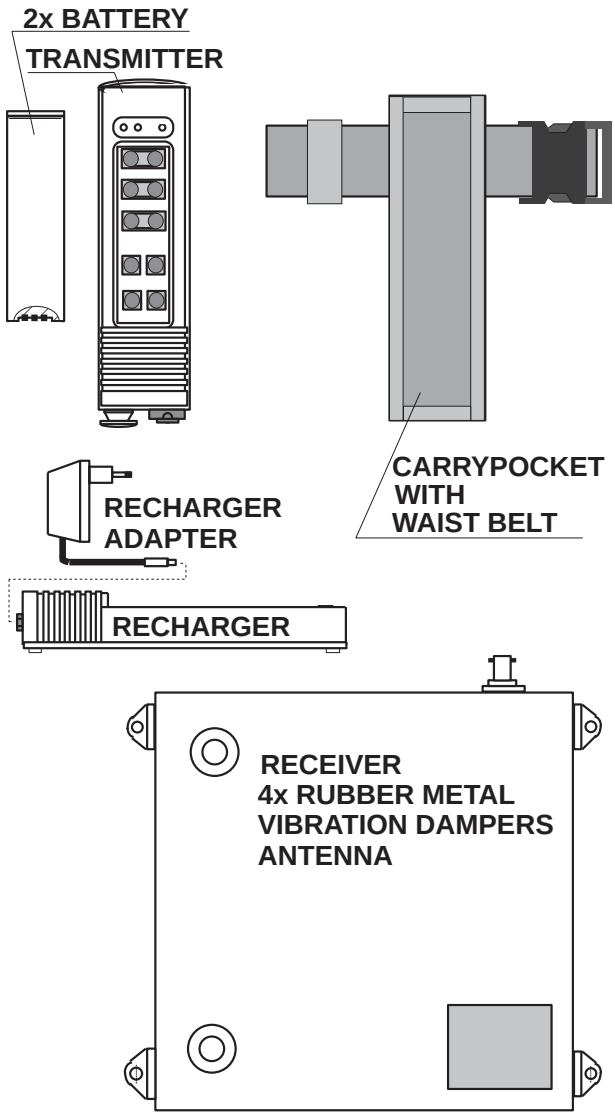
For notes

INSTALLATION

This chapter has been written for the electrician who is responsible for connecting the remote control system to the crane or the machine.

2.1 Components of the system

STANDARD SYSTEM



OPTIONS

PROCESSOR-CONTROLLED RECHARGER	TH-GA/PLG-08
ANTENNA CABLE	TH-AK/58-05
ROD ANTENNA	TH-AN/07-S
LOCATION DESIGNATION PLATES	TH-OS/40-01

2.1.1 Installation of the system

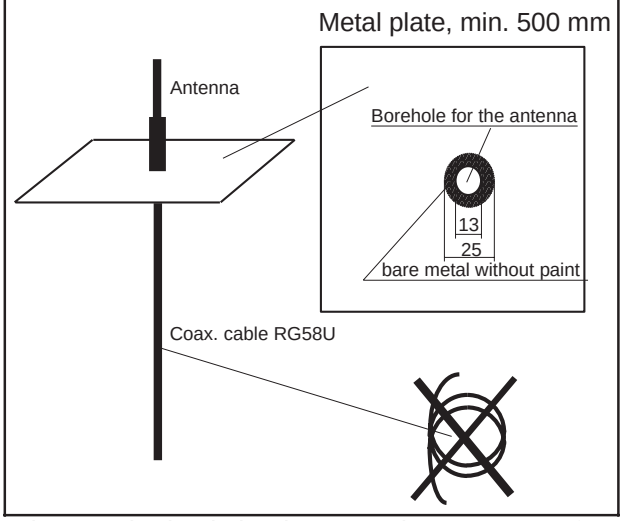
The system must be installed only by a specialist electrican.

It is essential to observe and meet the various regulations which are applicable, and in particular VDE and BDE.

☐ If the antenna is installed directly on the receiver (standard installation), ensure that there is sight contact where possible between the transmitter and the receiver.

☐ If the antenna is installed externally with a coax cable, it must be secured on an electrically conducting surface of approx. 1/4 m^2. It is again essential to ensure that there is sight contact between the transmitter and the receiver.

Example of an antenna installation sheet if there is no electrically conducting surface on the crane.



The standard solution is to supply an antenna for external installation with a 5m antenna cable (TH-AK/58-05). If a longer connection cable is required, type TH-AK/213-10 (10m) or type TH-AK/213-20 (20m) must be used. A longer connection cable is not recommended due to the cable losses and the resultant reduction in the range which can be obtained. It is also essential to ensure that any surplus antenna cable is cut off.

Under no circumstances is the antenna cable to be installed in loops.

☐ Installation of emergency end stop as per VBG 9 paragraph 15. The implementation rule is as follows:

The requirement is met,

- if the system is equipped with emergency end switches which take account of subsequent travel when installed.
- if the system is equipped with adjustable friction clutches which limit the working movement without any danger.
- if the system is equipped with pressure relief valves in hydraulic and pneumatic systems which limit the working movement.

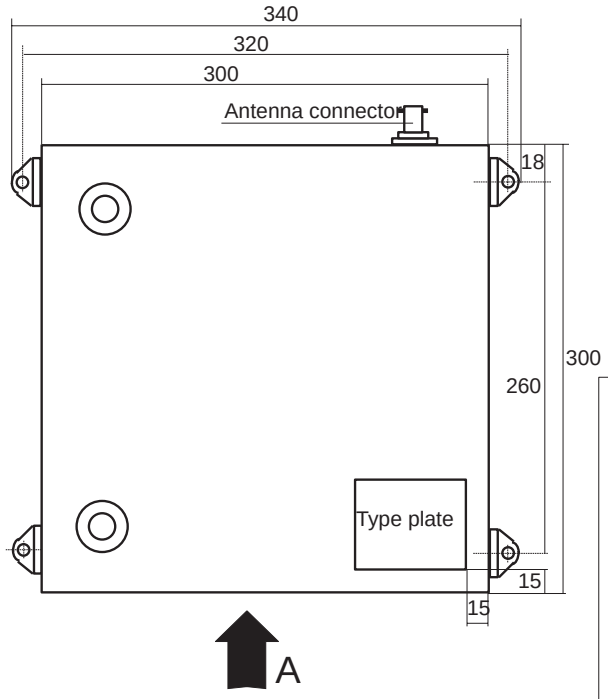
The other emergency end stops in VBG 9 paragraph 15 must of course still be installed.

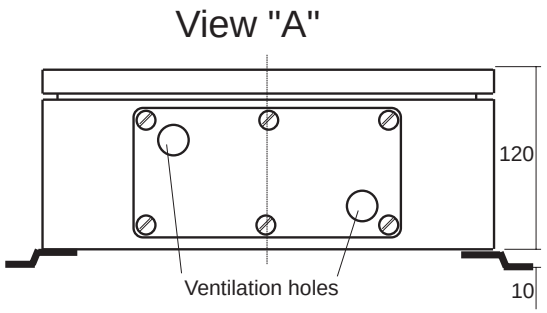
Ingress protection IP65 is only achieved if the welsh plugs have been installed on the receiver flange and if the control cable has been connected to the four-pin connector.

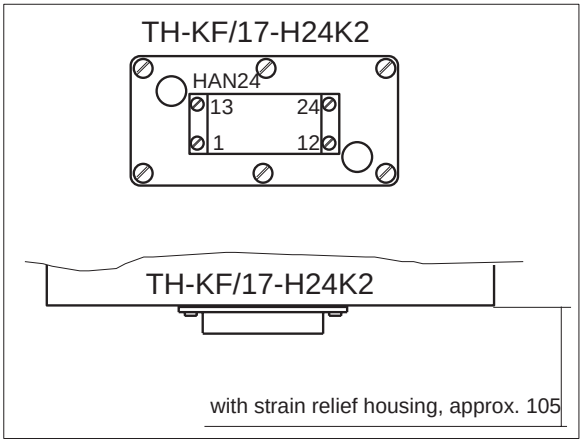
Remove the welsh plugs in order to avoid condensation forming on outdoor systems. Ingress protection IP65 is then no longer attained, and it is essential to ensure that rain is not able to penetrate when the system is installed (flange pointing downwards).

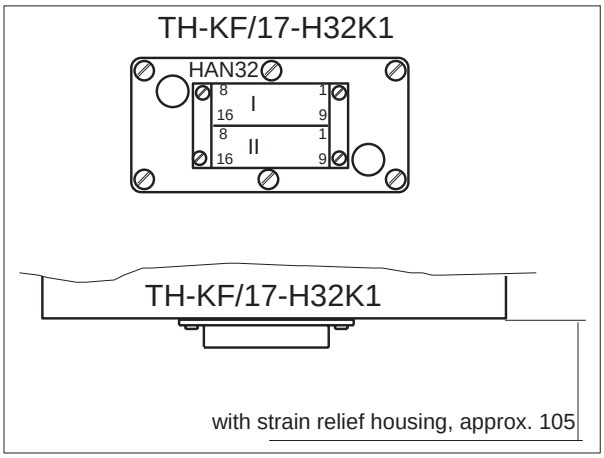
Never expose the receiver or transmitter to the jet of a high-pressure cleaning unit or water hose.

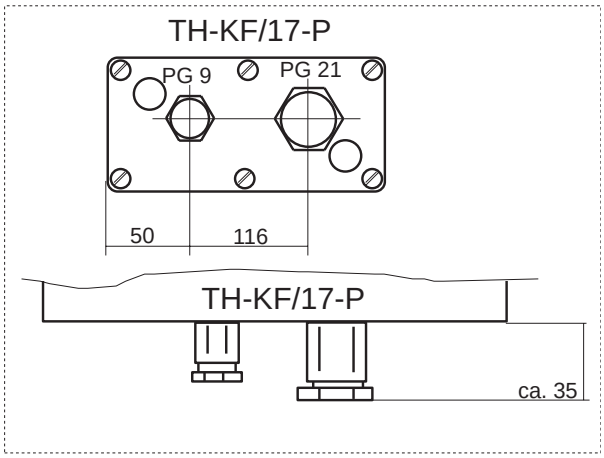
2.1.2 Installation dimensions receiver







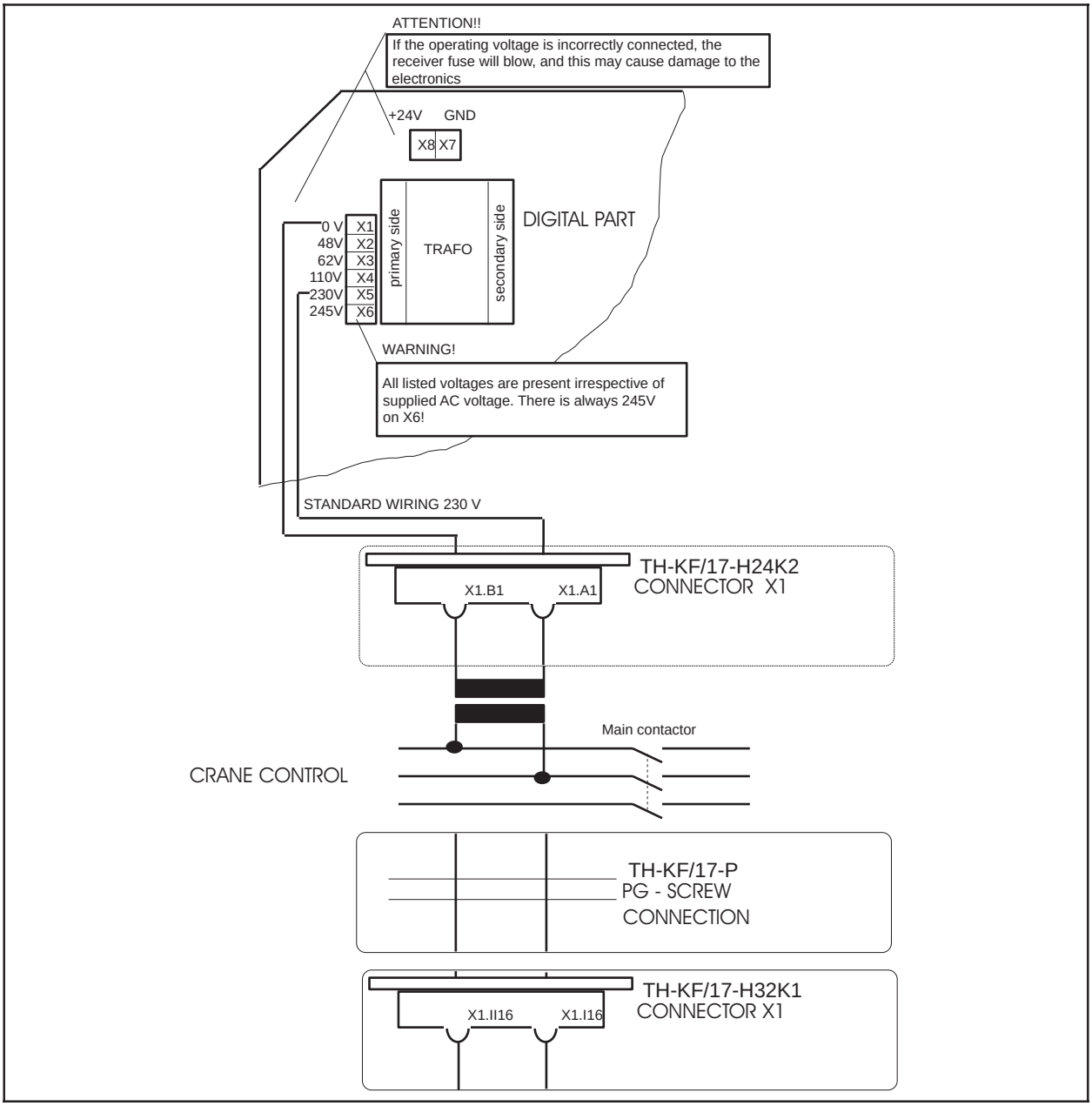




It is essential to ensure that there is sufficient space for the antenna and the Harting mating connector. Necessary installation area excl. antenna 500 x 400 mm

2.3 Connection to the power supply

The receiver voltage can be set as required to 48V, 62V, 110V, 230V, 245V AC 50Hz/60Hz +/- 10% or 24V DC +/-25% (max. permissible ripple voltage 100mVSS). The connecting cable must be connected only to the corresponding terminals of the digital part.

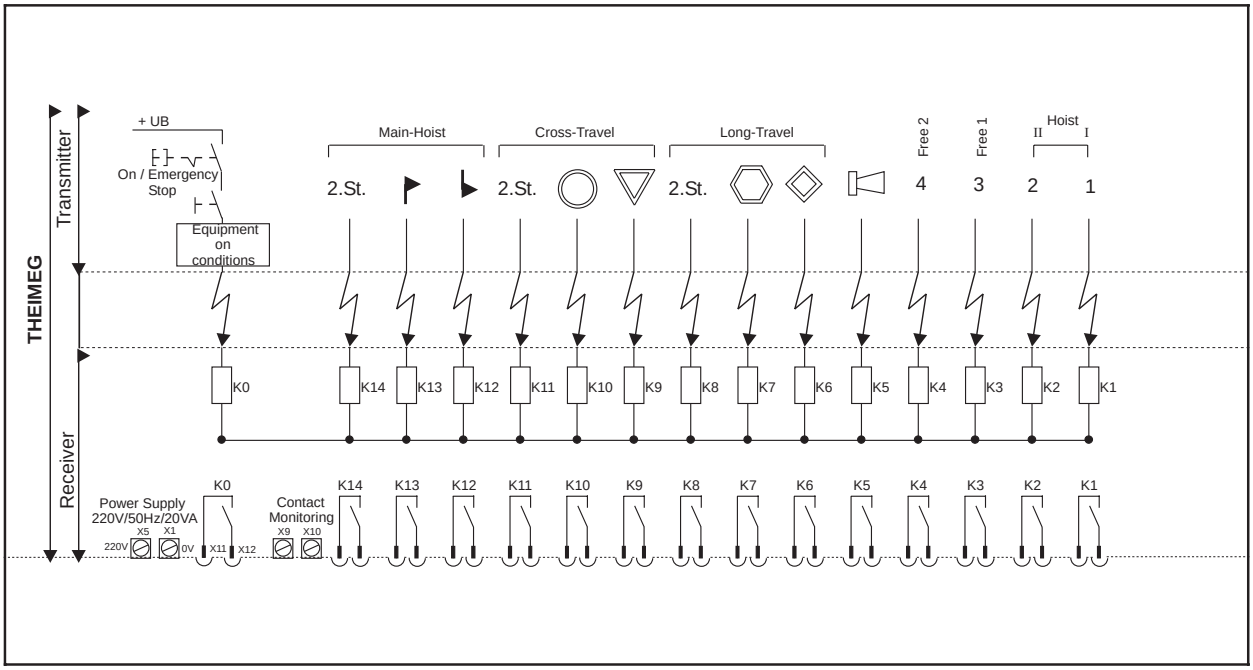


2.3 Interface specification

2.3.1 Technical diagram of the receiver

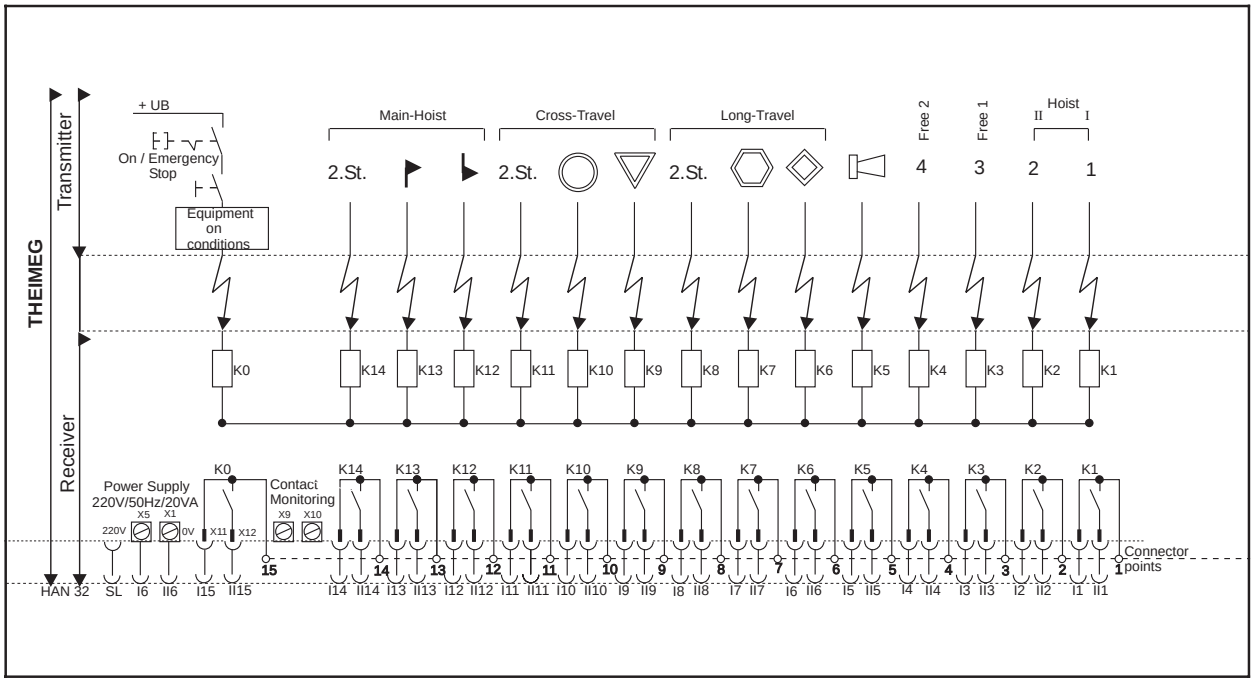
In general, it is essential to comply with the VDE regulations, local power supply company regulations and accident prevention regulations when installing the equipment.

2.3.1.1 Receiver TH-KF/17-E1-P



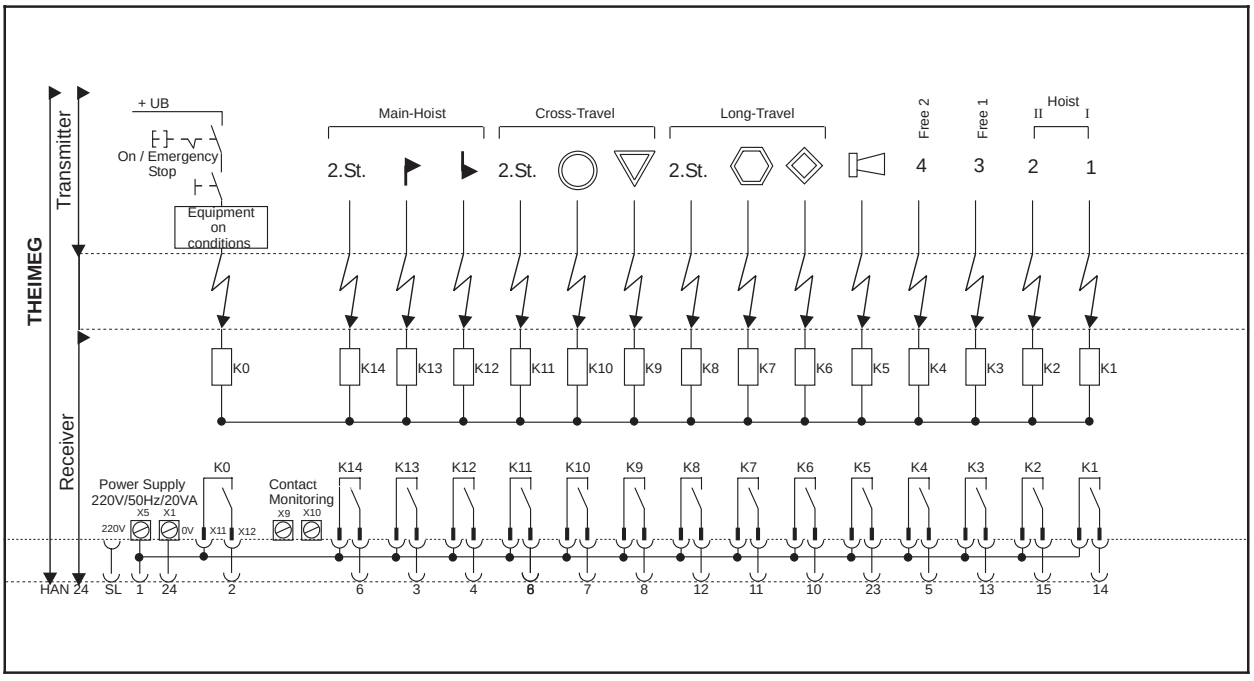
-Basic version without internal terminating wiring
-Control cable fed in through cable gland

2.3.1.2 Receiver TH-KF/17-E1-H32K1



-Basic version with 32-pin Harting connector with screw terminals
-Internal terminal strip permits simple linking of output potentials

2.3.1.3 Receiver TH-KF/17-E1-H24K2



-Basic version with 24-pin Harting connector with screw terminals
-All outputs connected to one potential

2.3.2 Configuration of transmitter Digital part

The transmitter digital part has a DIP switch which can be used for configuring the various settings.

- ☐ Configuration
- ☐ Transmission mode
- ☐ Operating mode

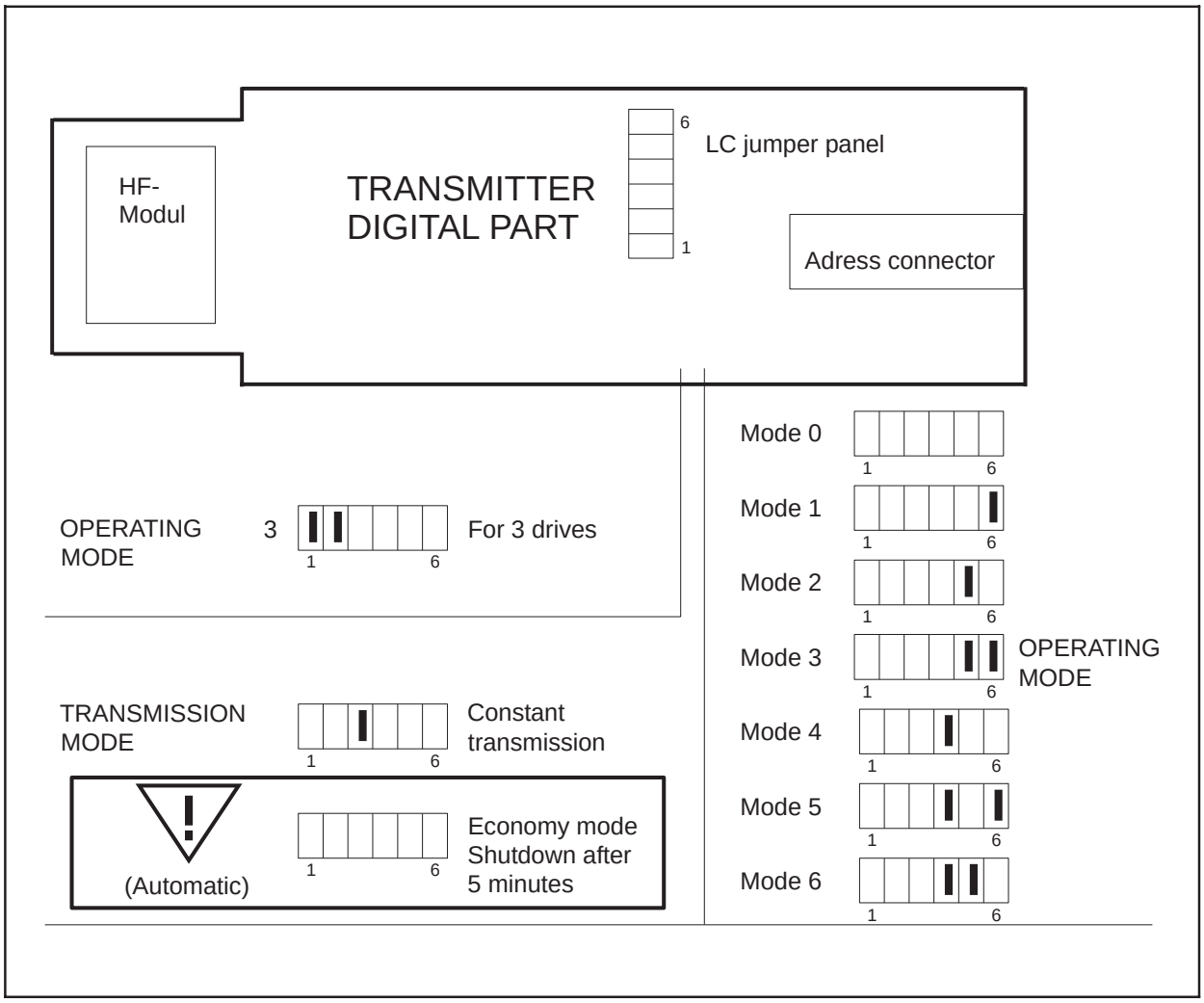
To access the digital part, loosen the four retaining screws of the transmitter so that the upper part and lower part can be hinged open.

Option: Economy mode

The transmitter switches off completely after five minutes

To switch the transmitter on again:

- ☐ Set key switch to setting “0"/setting ”1"



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Transmitter TH-KF/17-HS
Configuration

Each configuration has various operating modes which depend on the switching plan of the crane drives.

Drive interlinked according to

switching plan 0

switching plan 1

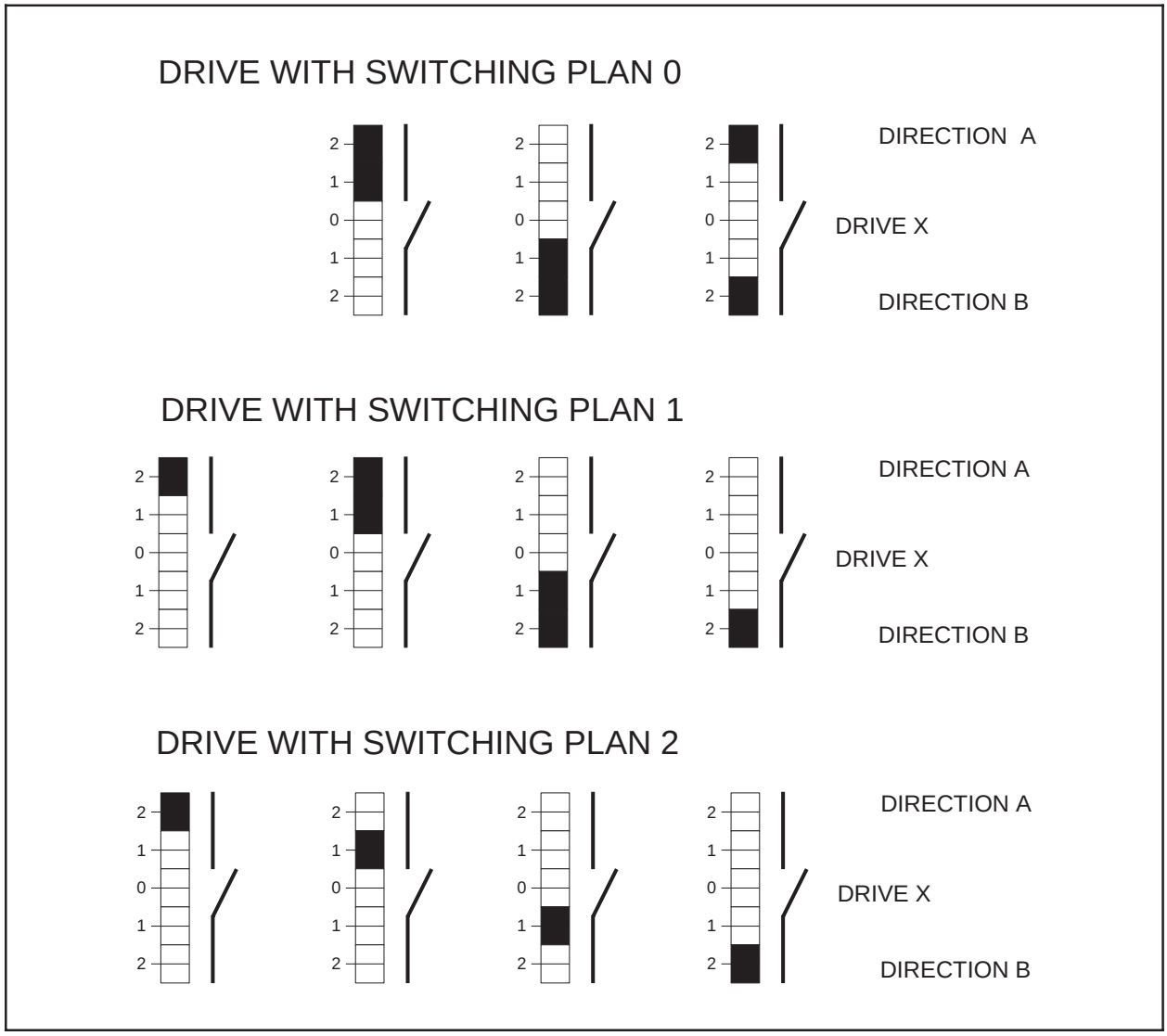
switching plan 2

All interlinked drives are two-stage drives.

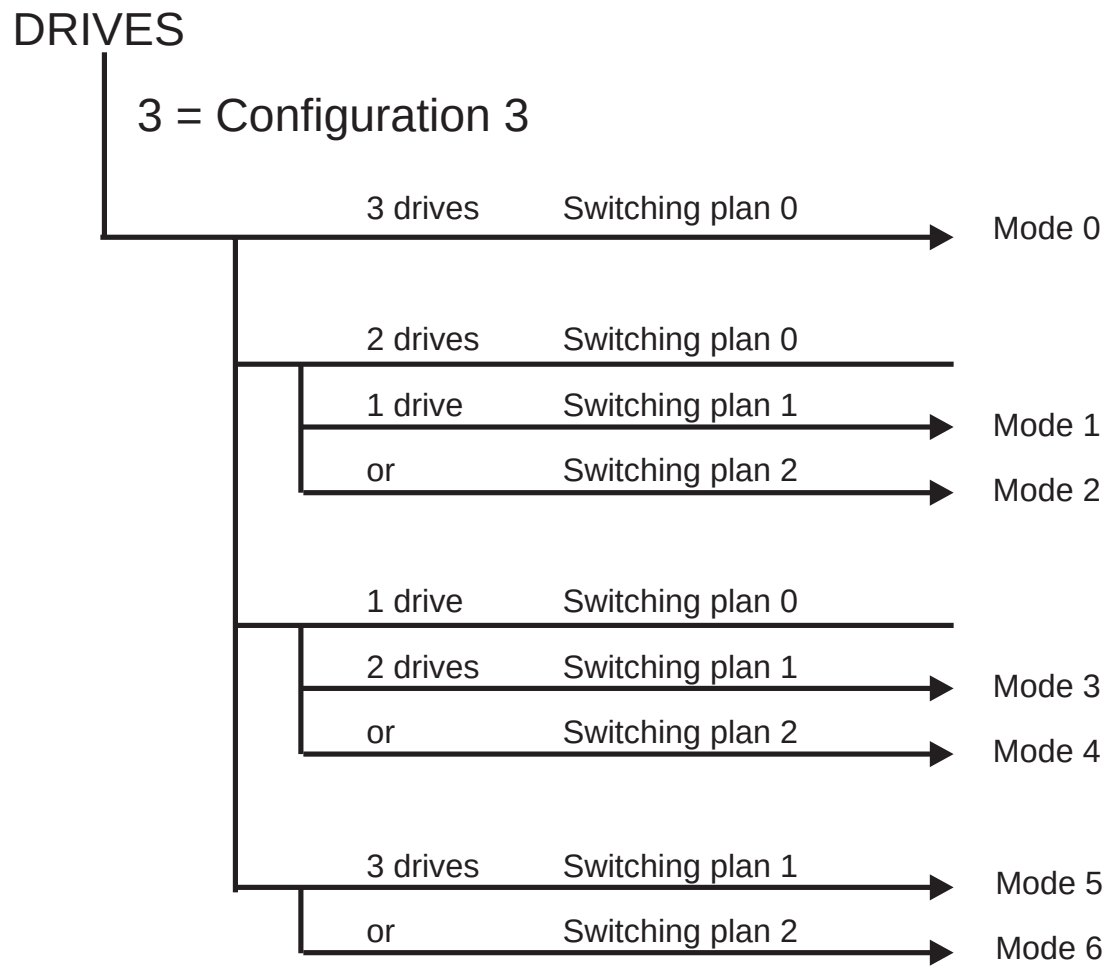
The input information of the transmitter are the three commands

A1-2, B1-2, A+B2=switching plan 0

The type of interlinking required depends directly on the design of the drive.



To determine the correct configuration and mode setting



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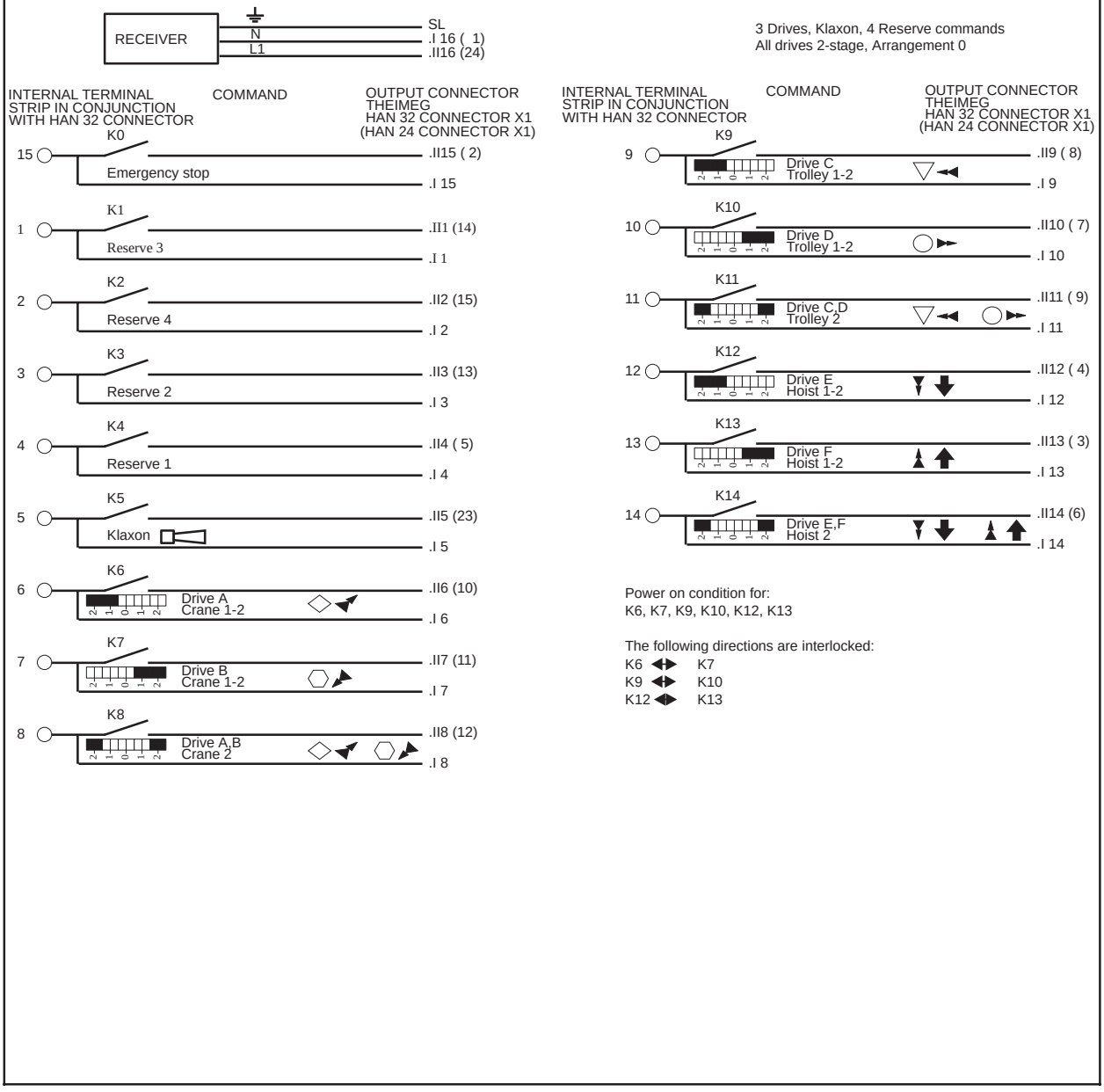
Type 3 mode 0



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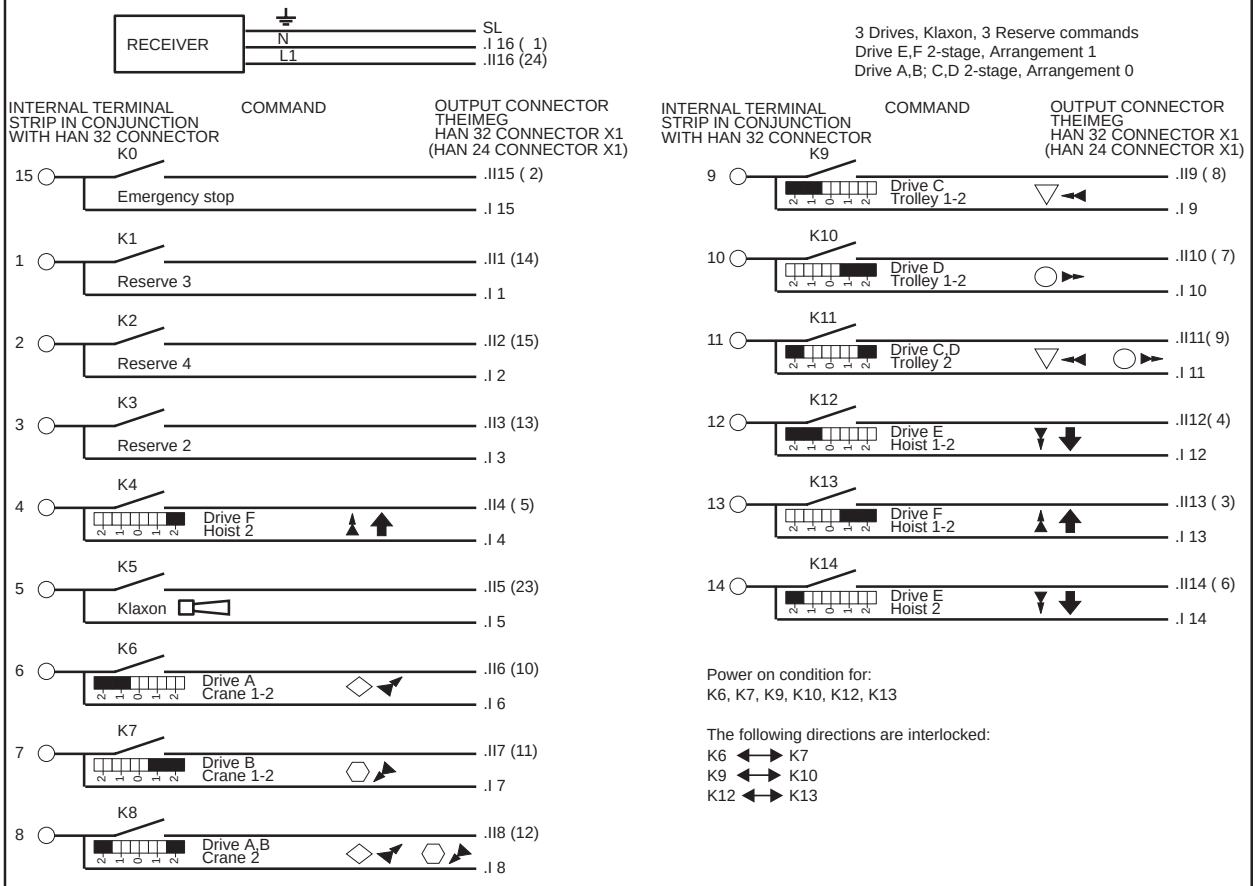
Type 3 mode 1



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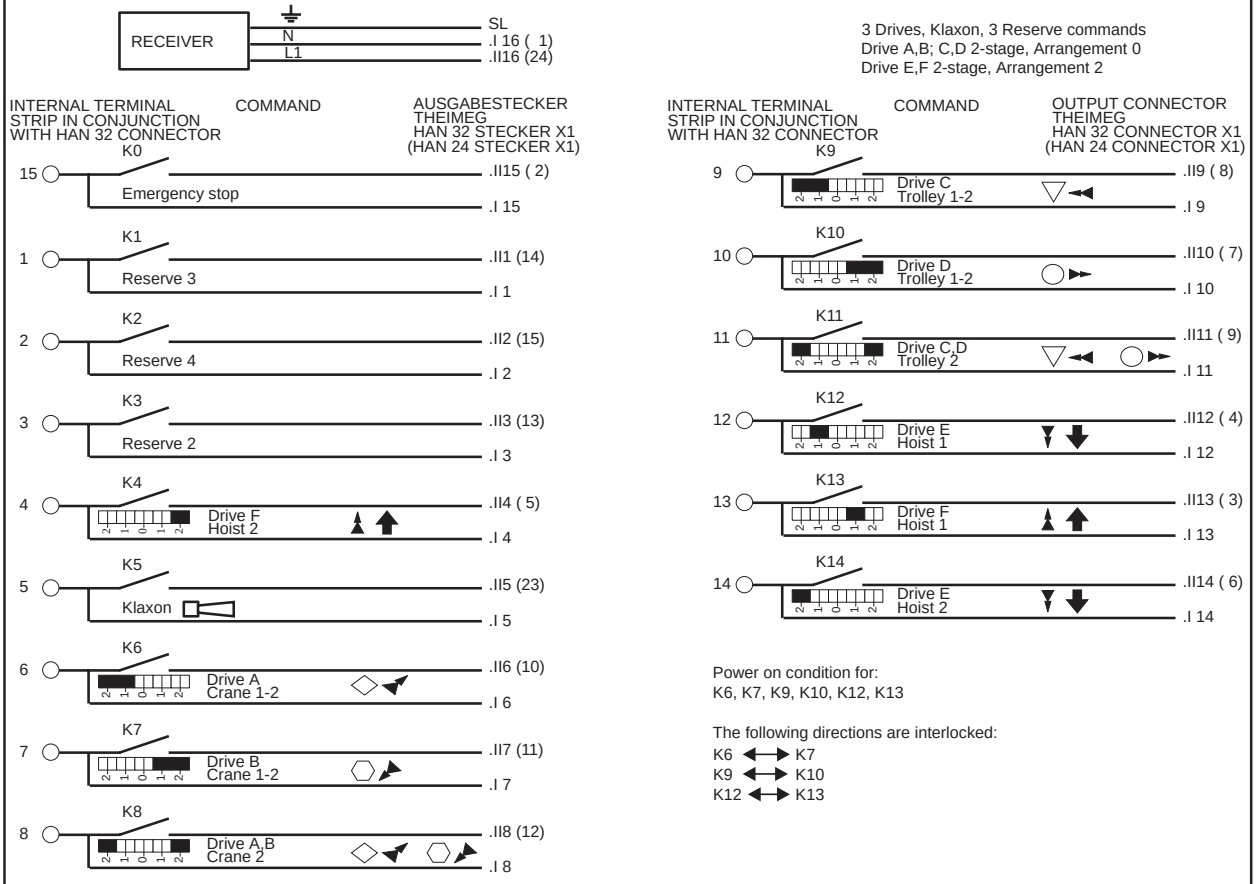
Type 3 mode 2



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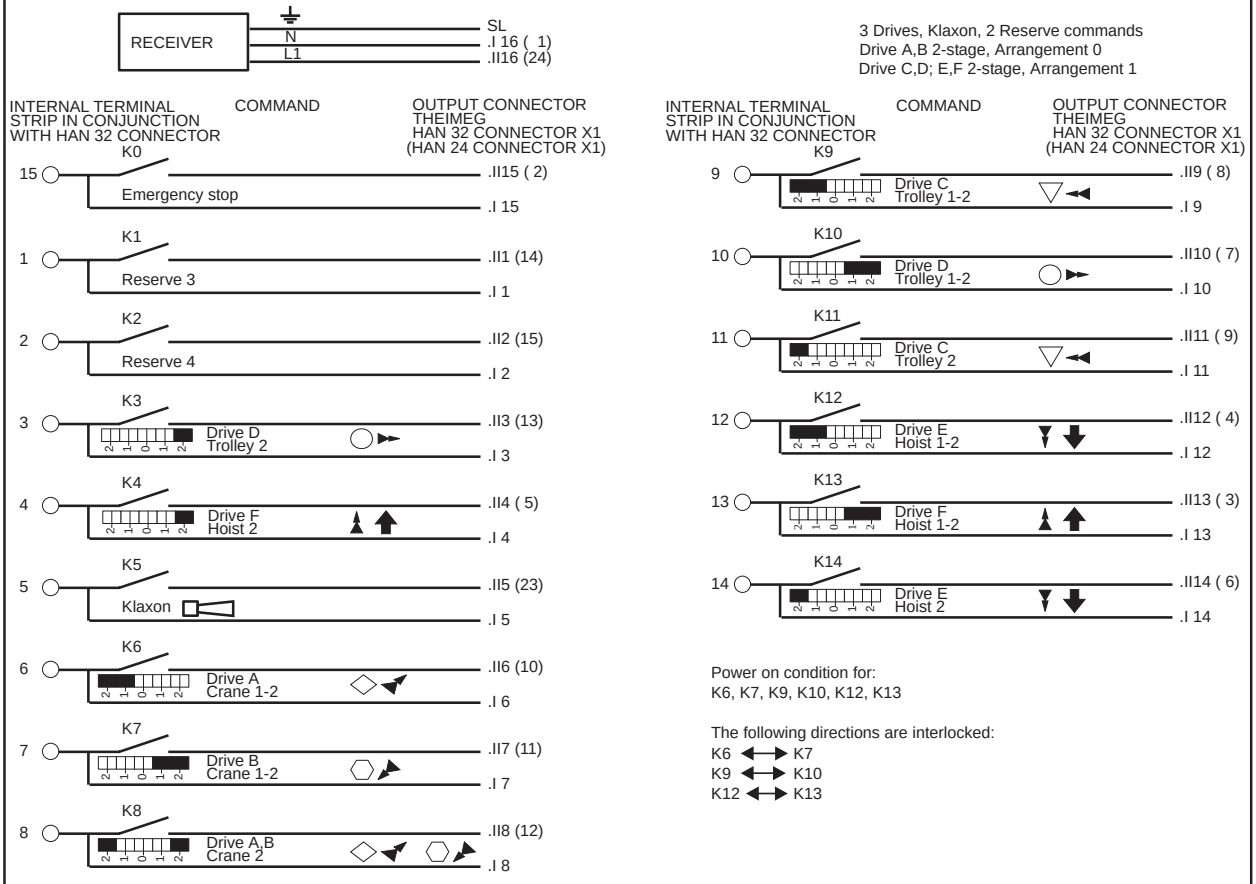
Type 3 mode 3



3 Drives, Klaxon, 2 Reserve commands
Drive A,B 2-stage, Arrangement 0
Drive C,D; E,F 2-stage, Arrangement 1

Power on condition for:
K6, K7, K9, K10, K12, K13

The following directions are interlocked:
K6 ◄► K7
K9 ◄► K10
K12 ◄► K13

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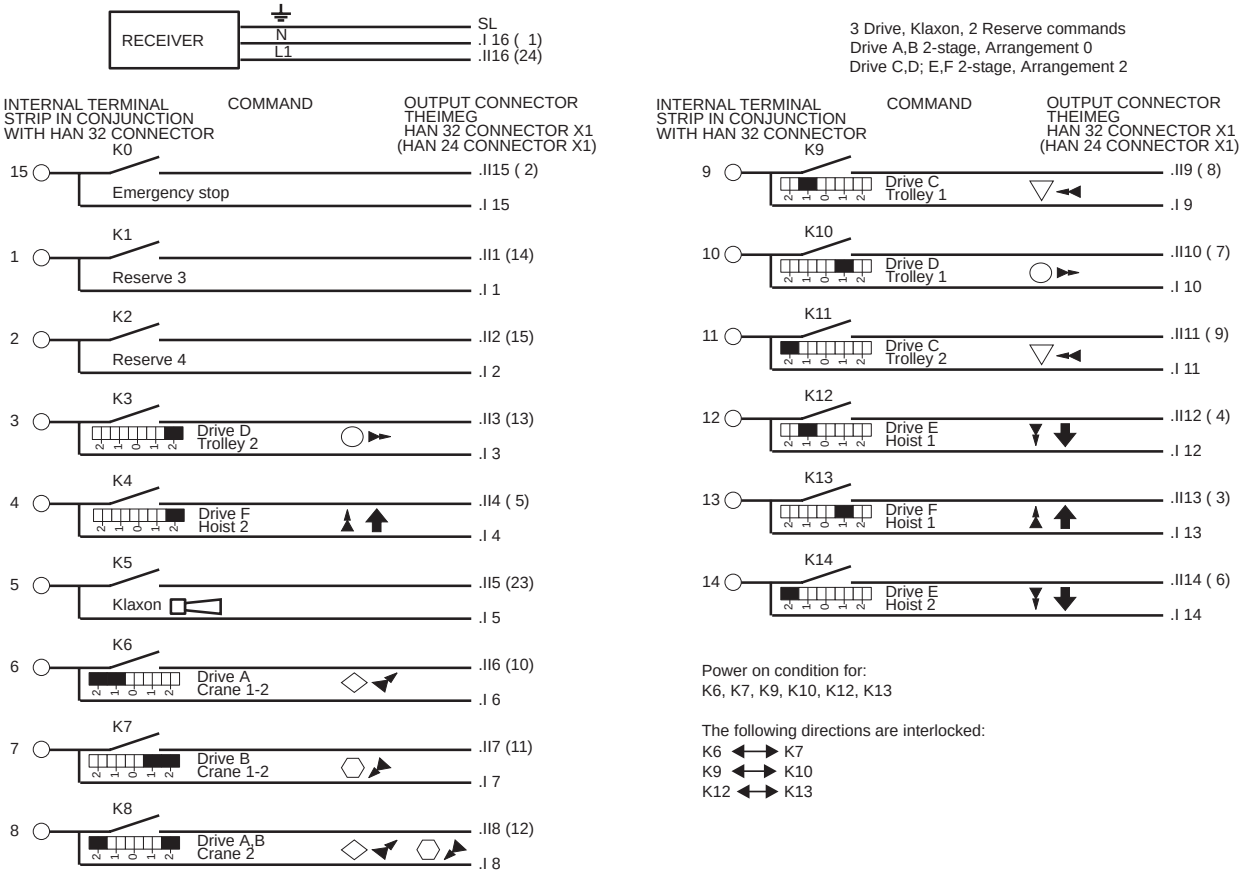
Type 3 mode 4



3 Drive, Klaxon, 2 Reserve commands
Drive A,B 2-stage, Arrangement 0
Drive C,D; E,F 2-stage, Arrangement 2

Power on condition for:
K6, K7, K9, K10, K12, K13

The following directions are interlocked:
K6 ◄► K7
K9 ◄► K10
K12 ◄► K13

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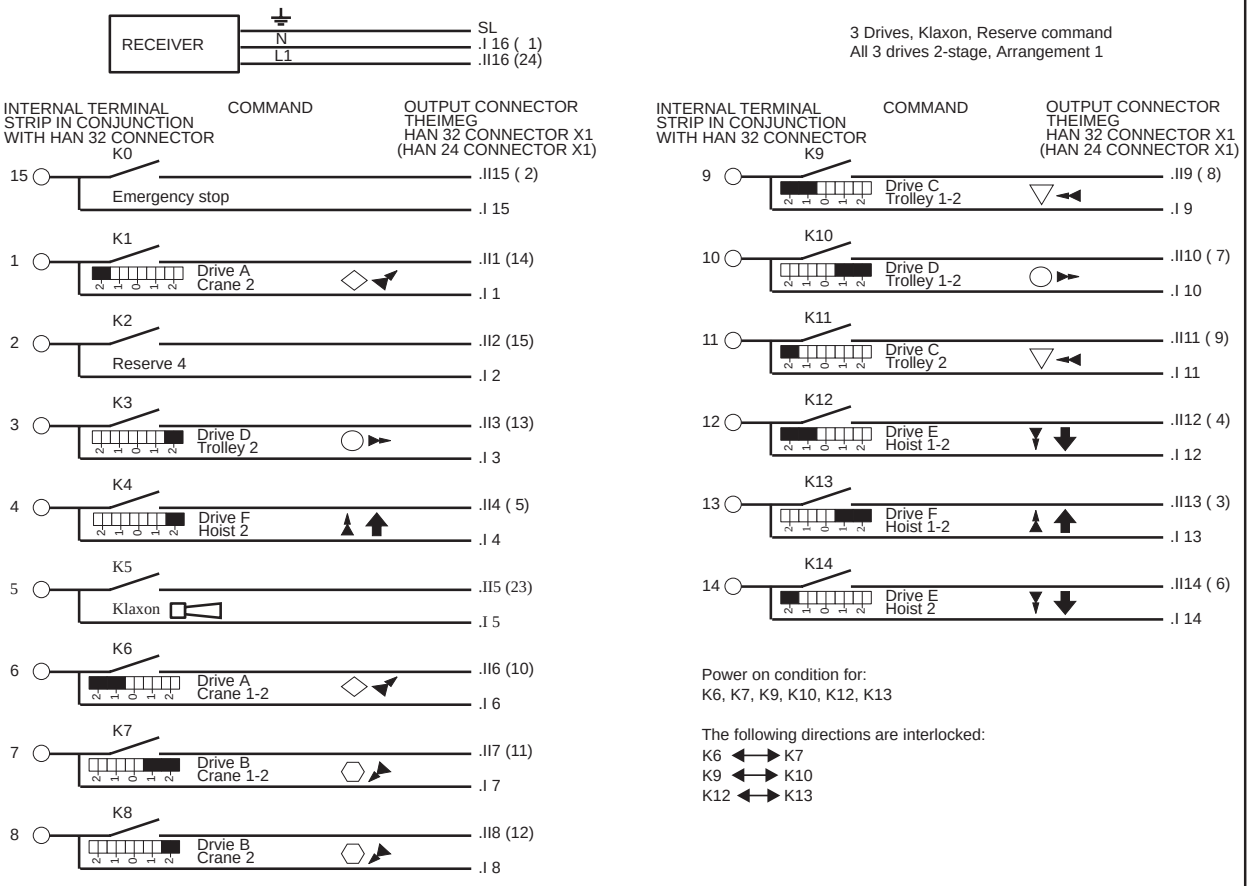
Type 3 mode 5



Power on condition for:
K6, K7, K9, K10, K12, K13

The following directions are interlocked:
K6 ◄► K7
K9 ◄► K10
K12 ◄► K13

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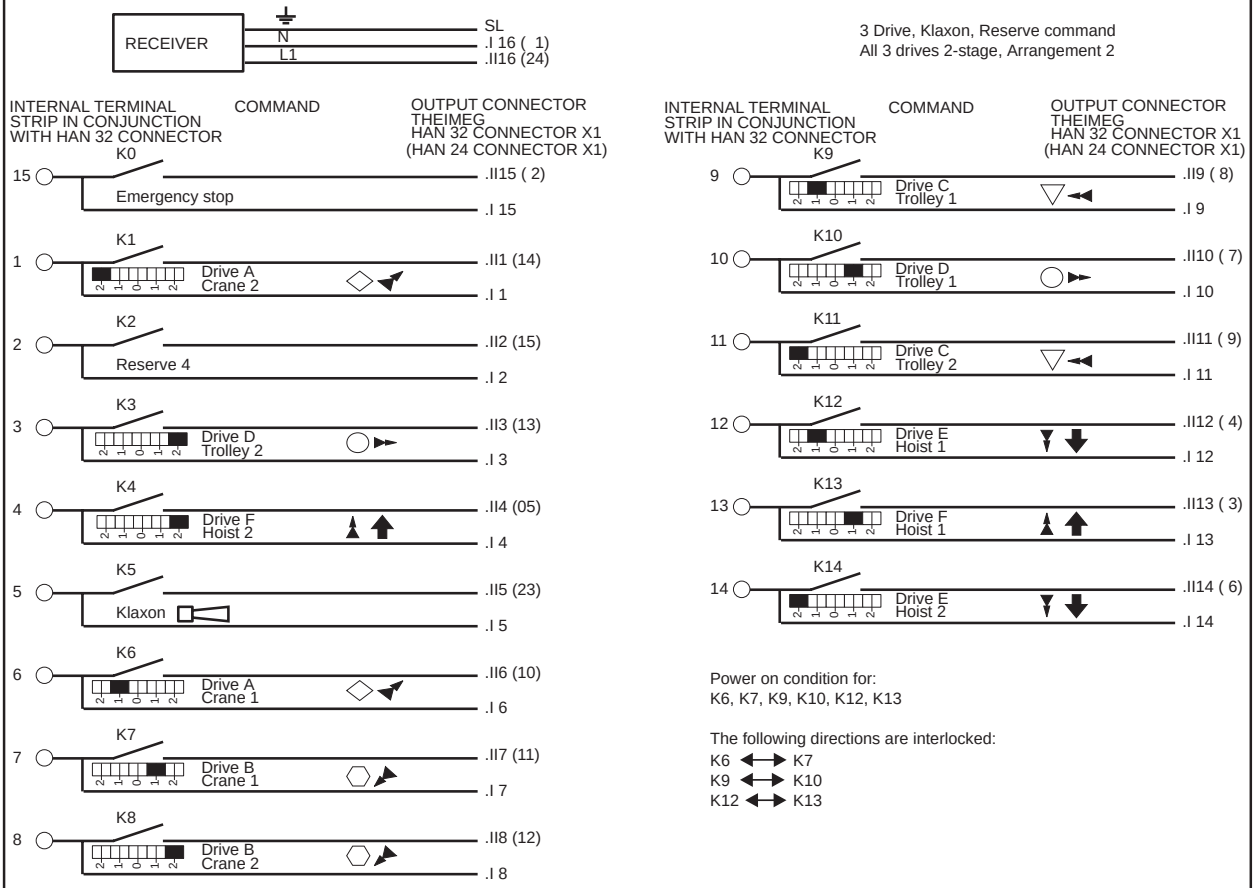
Type 3 mode 6



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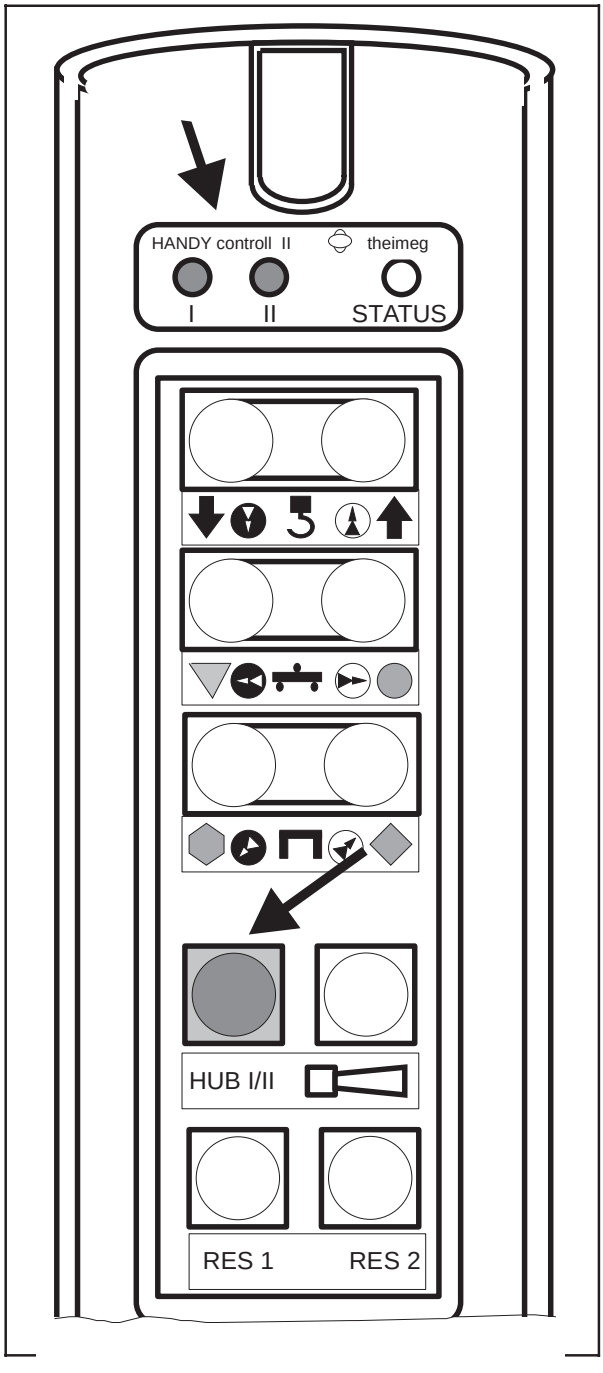
2.3.3 Hoist control

Switching between hoist I and hoist II

The trolley/hoist set by pressing the electric switch “hoist I/II” is indicated by the LEDs “I II” in the LED panel.

Hoist I	LED I lit
Hoist II	LED II lit
Hoist I +II	LED I + II lit



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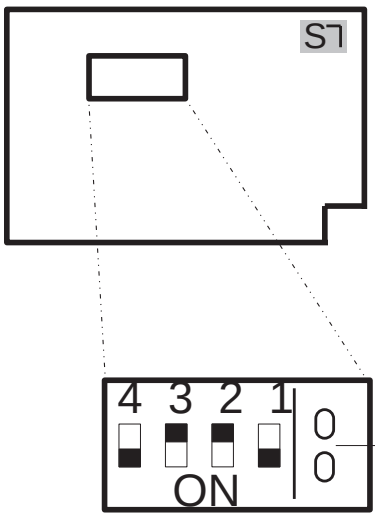
2.4 Channel and Frequency setting

Group A							Group B						
Channel	**Frequency**	**4-bits Switch**				**Jumper**	**Channel**	**Frequency**	**4-bits Switch**				**Jumper**
A1	433,875	ON	ON	ON	ON	ON	B1	433,900	ON	ON	ON	ON	OFF
A2	433,925	ON	ON	ON	OFF	ON	B2	433,950	ON	ON	ON	OFF	OFF
A3	433,975	ON	ON	OFF	ON	ON	B3	434,000	ON	ON	OFF	ON	OFF
A4	434,025	ON	ON	OFF	OFF	ON	B4	434,050	ON	ON	OFF	OFF	OFF
A5	434,075	ON	OFF	ON	ON	ON	B5	434,100	ON	OFF	ON	ON	OFF
A6	434,125	ON	OFF	ON	OFF	ON	B6	434,150	ON	OFF	ON	OFF	OFF
A7	434,175	ON	OFF	OFF	ON	ON	B7	434,200	ON	OFF	OFF	ON	OFF
A8	434,225	ON	OFF	OFF	OFF	ON	B8	434,250	ON	OFF	OFF	OFF	OFF
A9	433,275	OFF	ON	ON	ON	ON	B9	434,300	OFF	ON	ON	ON	OFF
A10	434,325	OFF	ON	ON	OFF	ON	B10	434,350	OFF	ON	ON	OFF	OFF
A11	434,375	OFF	ON	OFF	ON	ON	B11	434,400	OFF	ON	OFF	ON	OFF
A12	434,425	OFF	ON	OFF	OFF	ON	B12	434,450	OFF	ON	OFF	OFF	OFF
A13	434,475	OFF	OFF	ON	ON	ON	B13	434,500	OFF	OFF	ON	ON	OFF
A14	434,525	OFF	OFF	ON	OFF	ON	B14	434,550	OFF	OFF	ON	OFF	OFF
A15	434,575	OFF	OFF	OFF	ON	ON	B15	434,600	OFF	OFF	OFF	ON	OFF
A16	434,625	OFF	OFF	OFF	OFF	ON	B16	434,650	OFF	OFF	OFF	OFF	OFF

OFF
ON

4 3 2 1



Example for
434,200 MHz

Jumper= “OFF”

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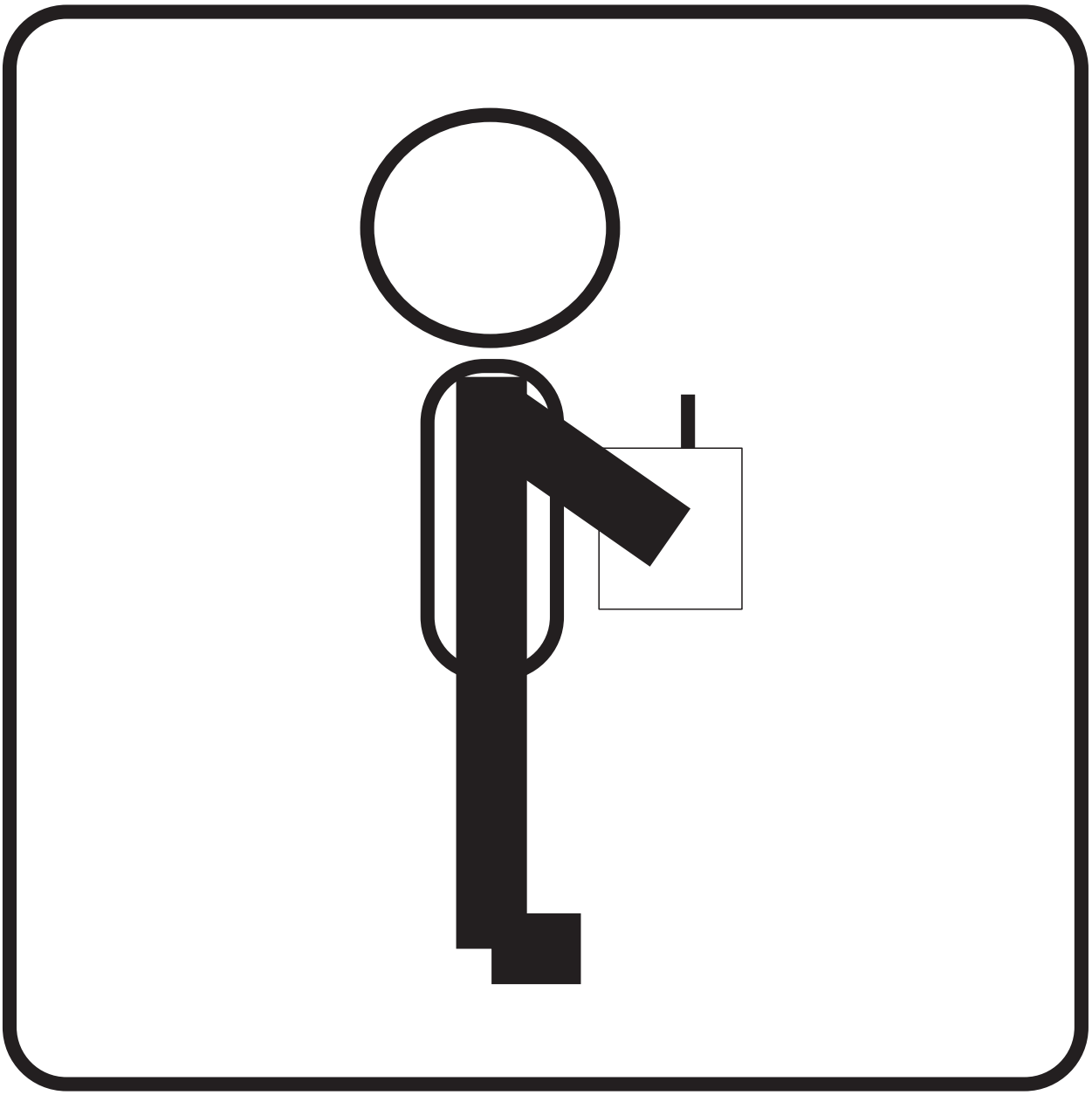

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For notes

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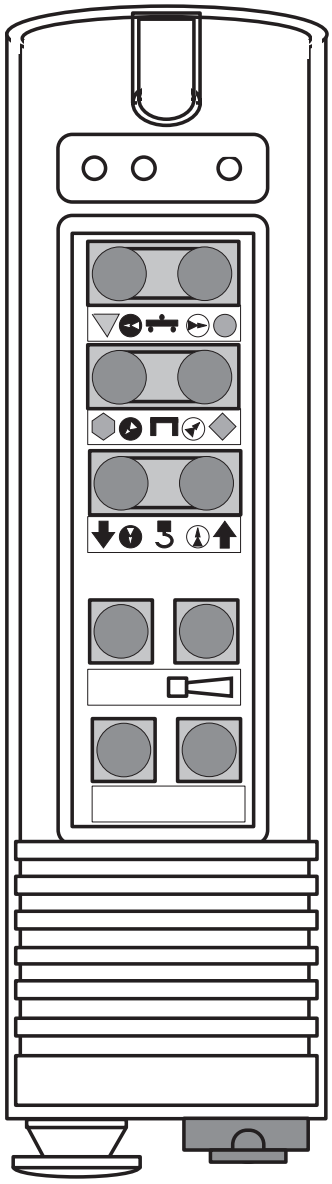
D-41748 Viersen, Clörather Str. 3
Tel. (02162) 372-0, Telefax (02162) 30724

OPERATION

3.1 Control panel of the transmitter

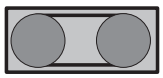


Key switch tumbler arrangement ED0001

Spare key, mechanism ED0001

Mushroom head emergency push button

Push button

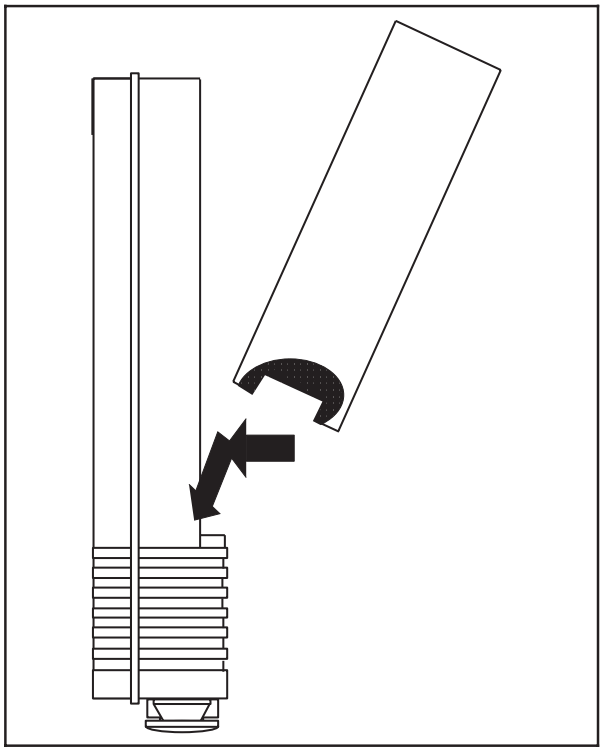


Twin travel button
Diaphragm for twin hoist button

LED panel

3.1.1 Switching on the transmitter = Switch pressed

Inserting the battery

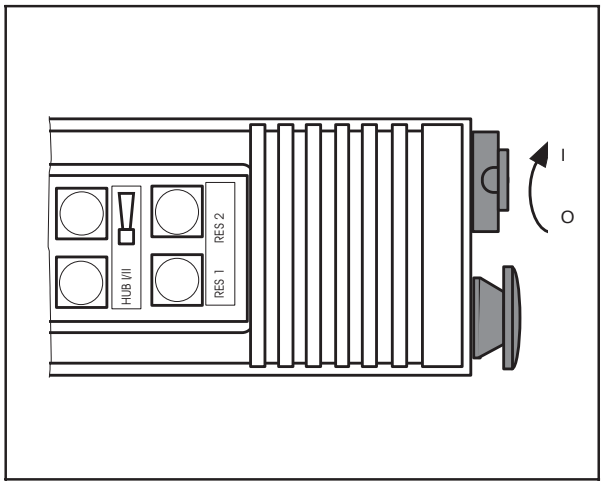


Insert the NC battery (mechanical device ensures that the battery cannot be inserted the wrong way round). Using the clip, press the NC battery into the corresponding notches and lock the battery by turning it clockwise.

Switching on

The equipment is switched on as follows:

- ☐ Pull “Emergency stop” button
- ☐ Set key switch to position “1"



This supplies power to the transmitter and the transmitter sends its information to the receiver. At the same time, the transmitter sends a unidirectional pulse.

The LED flashes once every second to indicate that the equipment is switched on.

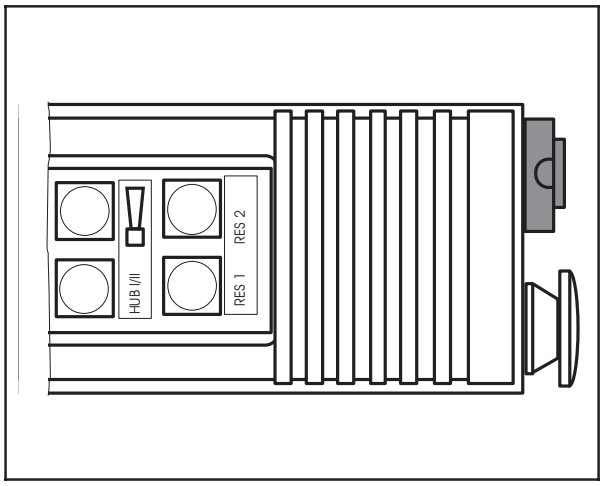
3.1.2 Switching off the transmitter

Normal shutdown

The normal shutdown procedure is as follows:

☐ Set key switch to position “0"

This disconnects power from the entire transmitter.

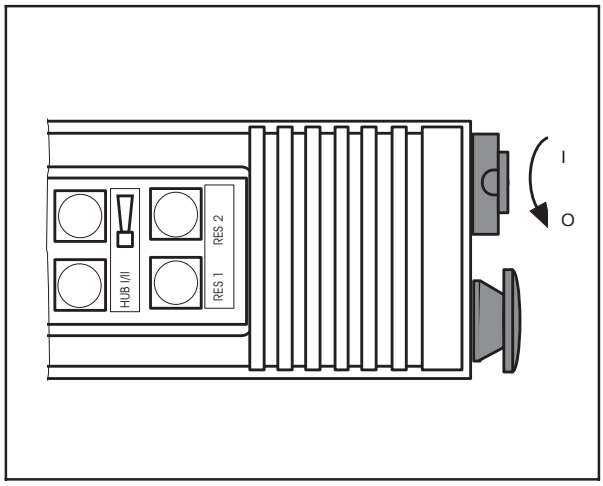


Note:

In order to increase the operating life of the battery, the transmitter should be switched off by means of the key switch whenever it is not being used.

Emergency shutdown

The emergency shutdown procedure is triggered off by pressing the emergency-stop button. The transmitter then sends three information blocks in direct succession with the emergency-stop signal to the receiver. The transmitter then switches off automatically.



Note:

If this emergency situation occurs, the transmitter must subsequently be switched off by means of the key switch.

Note:

The key switch must always be used for the normal shutdown procedure.

3.1.3 Passive shutdown of the transmitter

System fault or hardware fault

The transmitter shuts down automatically after 15 seconds if a system or hardware fault occurs. The LEDs flash to indicate the fault which has caused the equipment to shut down.

Undervoltage detection

If the transmitter power supply of the battery falls below the set limit value within 5 seconds after the transmitter being activated, the transmitter immediately shuts down and the LEDs are activated. (LED flashes 9x short and 1x long)

ATTENTION

The battery must be replaced.

If undervoltage occurs during operation, the equipment generates an interval signal which is indicated by the LEDs flashing in a 5Hz cycle.

ATTENTION

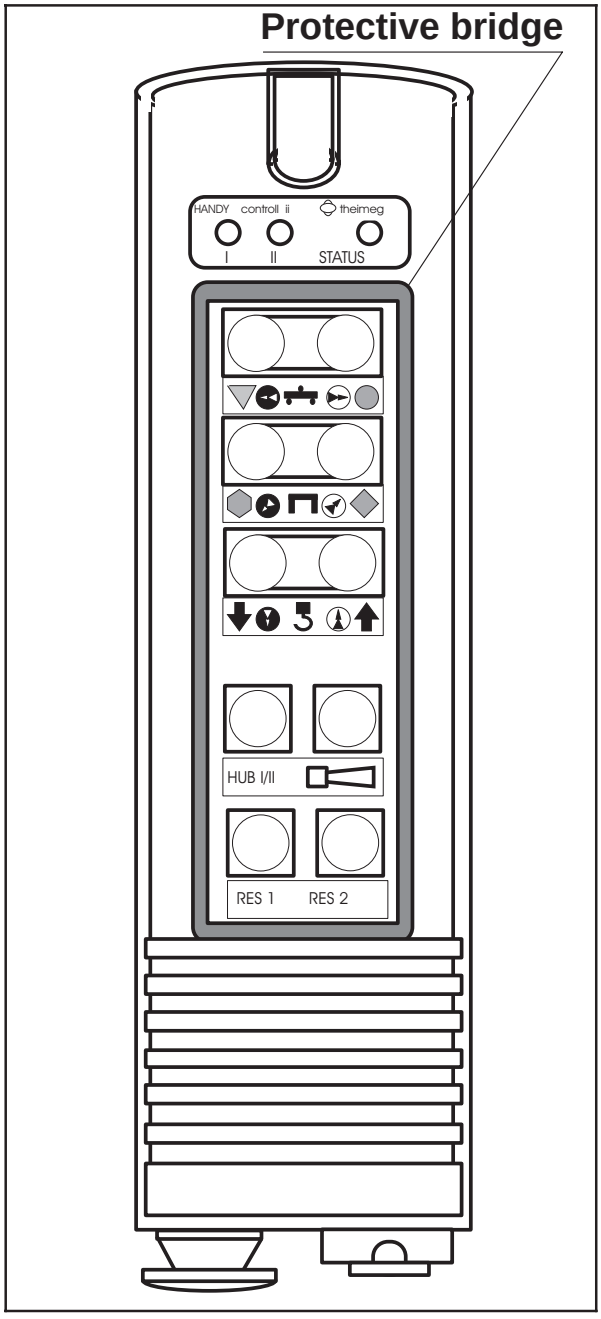
The battery must be replaced.

If the battery is not replaced, the equipment is automatically shut down after a variable time, which depends on the period during which the transmitter has been activated; this ensures that the battery is not damaged.

3.1.4 Protection against inadvertent operation

This is achieved as follows for the transmitter described at this point:

☐ by means of a protective bridge for command generators



3.2 Test overview and test protocol

Type of test	What aids are required	Who can perform the check	How frequently does the check have to be repeated	Where can the test take place	Test documents
Check of safety interlocking	No aids	Operating personnel	Before the start of every shift	On the crane or the machine	Daily technical safety check as detailed in chapter Operation 3.3.1
Check the state of the system	No aids	Maintenance electrician	Every year	On the crane or the machine	Check as per chapter Maintenance and care 4.5

The following is an example of a test protocol and a blank form for drawing up a test manual.

The checks must be recorded in this test protocol.

Seq. no.	Type of check (see test overview)	Tester	Date	Signature of tester	Comments
1	Check the state of the system	A.N. Other	21.09.92	*A.N. Other*	System checked in accordance with regulations
2					

Technical safety check

Seq. no.	Type of check (see test overview)	Tester	Date	Signature of tester	Comment
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

3.3.1 Daily technical safety check

3.3.1.1 Check manual/radio switchover (if applicable)

Test procedure

- ☐ Switch crane to radio operation
- ☐ Switch on receiver power supply
- ☐ Switch off key switch on the transmitter
- ☐ Hold down emergency-stop switch on the transmitter

Function

Main contactor must not be switched on

Problem

Main contactor is switched on

Measure

- ☐ Notify maintenance personnel

3.3.1.2 Check the drives and their zero position for inter-locking

Test procedure

- ☐ Pull the emergency-stop switch on the transmitter
- ☐ Deflect the master switch and keep in this position, or press the push-button and keep in this position
- ☐ Switch on key switch

Function

Corresponding drive must not become active

The other drives must be tested in the same way.

Problem

Corresponding drive becomes active

Measure

- ☐ Press emergency-stop button
- ☐ Use key switch to switch off transmitter and notify maintenance personnel.

3.3.1.3 Check the active emergency-stop system

Procedure

- ☐ Switch off the transmitter with the key switch
- ☐ Ensure that the activation conditions detailed in chapter Operation 3.1.1 are met.
- ☐ Set key switch to position “ I ”.
- ☐ Press control for acoustic warning signal (claxon).

Function

The claxon must sound

- ☐ Press the emergency-stop button

The claxon signal must stop after 0.5 seconds

Problem

The claxon signal does not stop after 0.5 seconds

Measure

- ☐ Switch off the transmitter with the key switch
- ☐ Deactivate the entire remote control system
- ☐ Notify the maintenance personnel

3.3.1.4 Check of passive emergency-stop system

Procedure

- ☐ Set key switch to position “ 0 ”.
- ☐ Pull the emergency-stop switch.
- ☐ Set key switch to position “ I ”.
- ☐ Press control for acoustic warning signal (claxon).

Function

The claxon must sound

- ☐ Switch off the transmitter with the key switch

The claxon signal must stop after 2 seconds

Problem

The claxon signal does not stop after 2 seconds

Measure

- ☐ Remove the transmitter battery
- ☐ Deactivate the entire remote control system
- ☐ Notify the maintenance personnel

3.3.1.5 Check emergency end stop

3.4 MAINTENANCE

Regular maintenance of the main radio control system is an important criterion to ensure high availability of the remote control system.

We recommend that the measures listed at this point, in addition to the daily technical safety checks, be performed every three months.

In addition, we recommend that a major technical safety inspection be performed by Theimeg customer service once every year.

3.4.1 Maintenance of the transmitter

ATTENTION:

Remove battery before checking

- ☐ Check to ensure that the housing is tight.
- ☐ Screw apart the upper part and lower part, and check sealing rubber with guide.
- ☐ Are there any traces of damp or dust, etc. in the transmitter?
- ☐ Check the housing for cracks or other damage.
- ☐ Are the rubber sleeves of the controls OK?
- ☐ Are the springs and locking facility of the controls OK? (Replace the switch if they are not OK.)
- ☐ Visual inspection of wiring harnesses (check for pinching and abrasions).
- ☐ Ensure that connectors are connected securely.
- ☐ Check battery for damage.
- ☐ Check correct functioning controls with the receiver (are all commands carried out?)

ATTENTION!

When controls are replaced, it is essential to observe the production regulations concerning installation and sealing measures.

3.4.2 Maintenance of the receiver

ATTENTION:

Pull plug out of socket before checking.

- ☐ Check to ensure that housing is tight.
- ☐ Are the seals in the lid OK?
- ☐ Are there any traces of damp or dust, etc. in the receiver?
- ☐ Tighten all connecting and retaining screws (incl. the electrical terminals which are not used!).

WARNING:

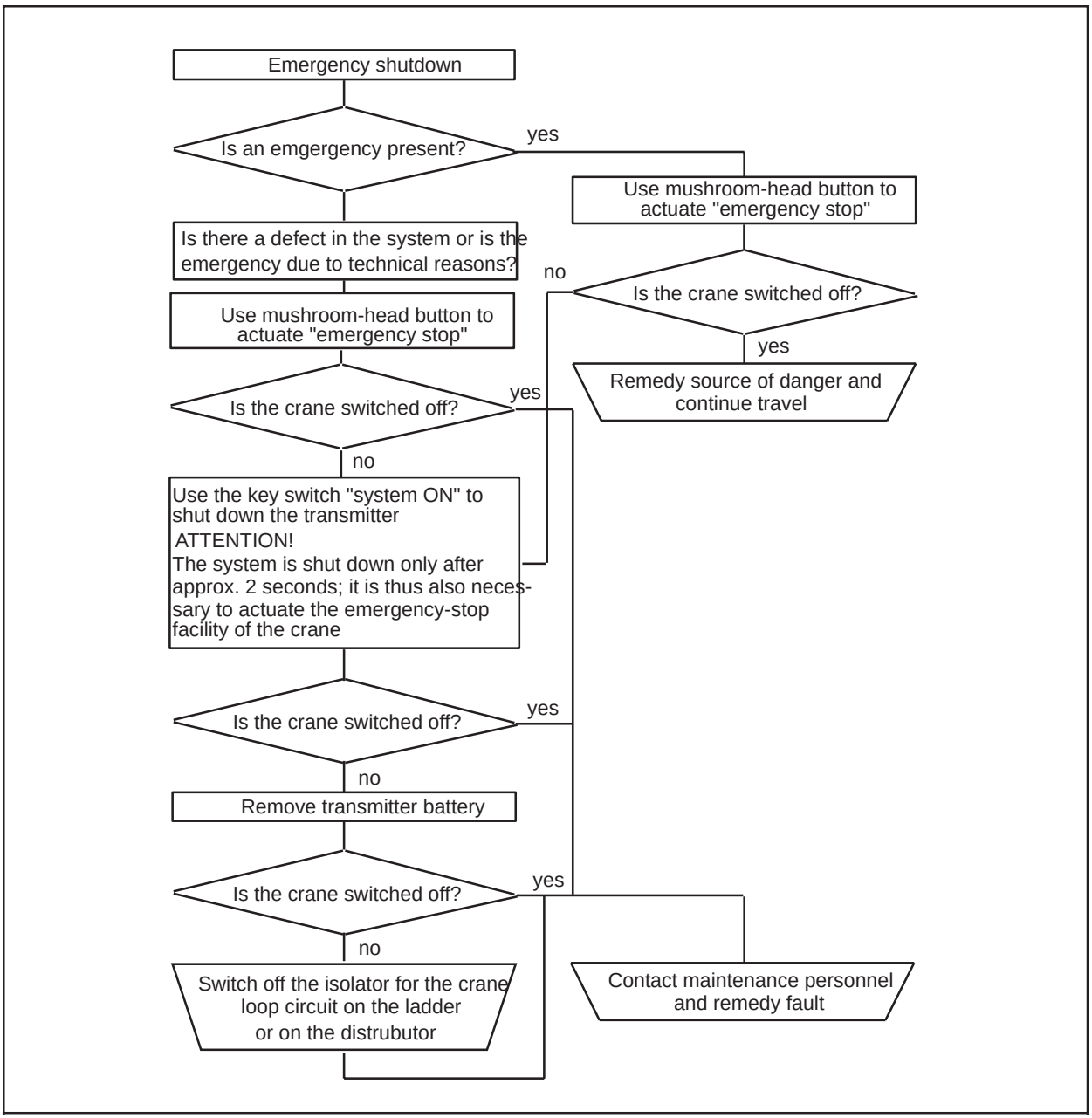
Switch off the system before performing the following:

- ☐ Visual inspection of the wiring harnesses (check for pinching and abrasions).
- ☐ Check that connections fit tightly.
- ☐ Check connectors, antenna and antenna bracket for corrosion.
- ☐ Check that PCBs are seated securely.

3.5 Proposed shutdown procedure in emergency situations

The correct behaviour during emergency situations must be tested with the operating personnel. The shutdown procedure detailed in the following is a proposal for correct behaviour during an emergency situation.

The shutdown procedure must be performed in accordance with the local circumstances and statutory regulations.



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4 Fault in the system

If a fault is identified in the remote control system, it is essential to ensure that the affected remote control system cannot be used any further under any circumstances.

Maintenance work performed on mechanical and electrical parts in the remote control system require special knowledge, and may be performed only by appropriately trained personnel who have attended a special training session held by Theimeg. Any unauthorised intervention in the remote control system will result in the warranty becoming invalid and all liability being excluded.

If appropriately trained personnel is not available, simply return the defective system for repair to our works. The system will generally be returned in a few days.

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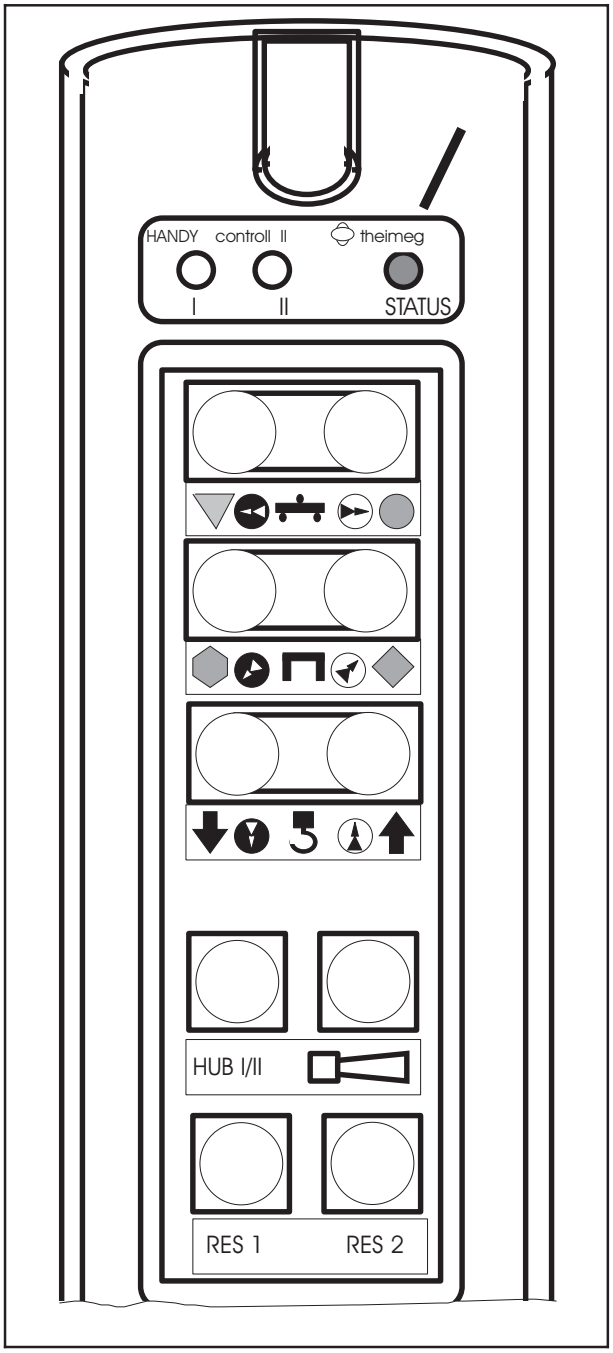
4.1 Display and diagnosis in the transmitter

Short flashing sequences followed by a long break indicate a hardware or system fault which do not permit the transmitter to be operated and which shut down the transmitter after 20 seconds.



The flashing sequences have the following meaning:

1x flashing
Fault in the control processor
Replace digital part

2x flashing
Communication error between input and control processor.
Replace digital part

3x flashing
Fault in the input processor
Replace digital part

4x flashing
Emergency-stop pressed when transmitter switched on.
The receiver is not switched on. Repeat activation procedure correctly. If this error message is displayed during operation, this indicates a defective control.
Check controls for faults

5x flashing
Fault in the modulation hardware
Replace digital part

6x flashing
Stop after undervoltage
Replace battery

7x flashing
Fault in the address
Address connector not inserted correctly or defective
Check that the address connector is correctly seated

8x flashing
Interrupted message transmission
Replace digital part

9x flashing
Undervoltage when system is switched on.
Undervoltage during the first 5 seconds after the system is switched on (passing make contact).
The battery must be replaced.

Status LED

Slow constant flashing, 1Hz cycle
Switch on condition satisfies “TRANSMITTER ON”

Rapid constant flashing, 5Hz cycle
Undervoltage occurs during operation.
The transmitter switches off depending on the time during wich it has been operating.

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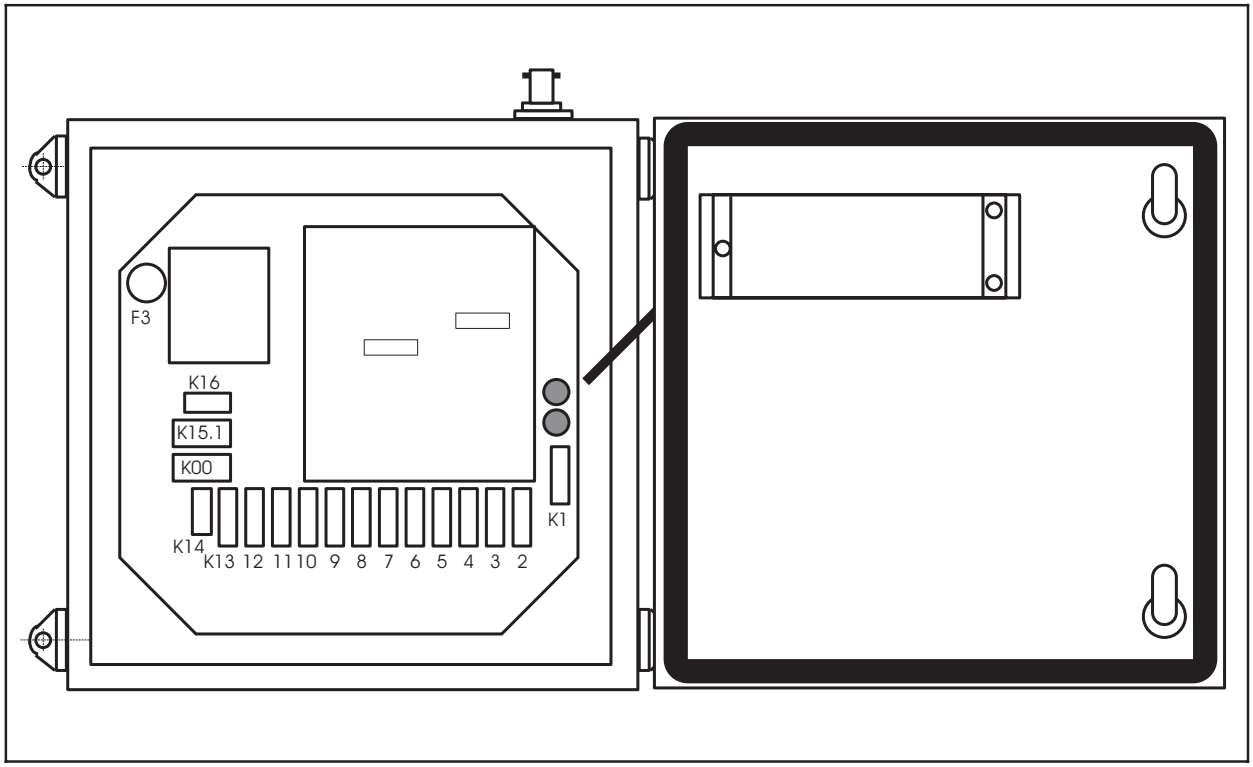
4.2 Display and diagnosis in the receiver



Both LEDs **flashing at the rate of the passive emergency-off time**

Receiver connected to mains voltage

If the two LEDs are not flashing

Check the fuse in the receiver, or check to ensure that the power supplies of the transmitter and receiver are seated securely.

One LED **flashing in message sequence**

Receiver is receiving signals

Both LEDs **permanently lit**

Hardware fault

Replace digital part

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For notes

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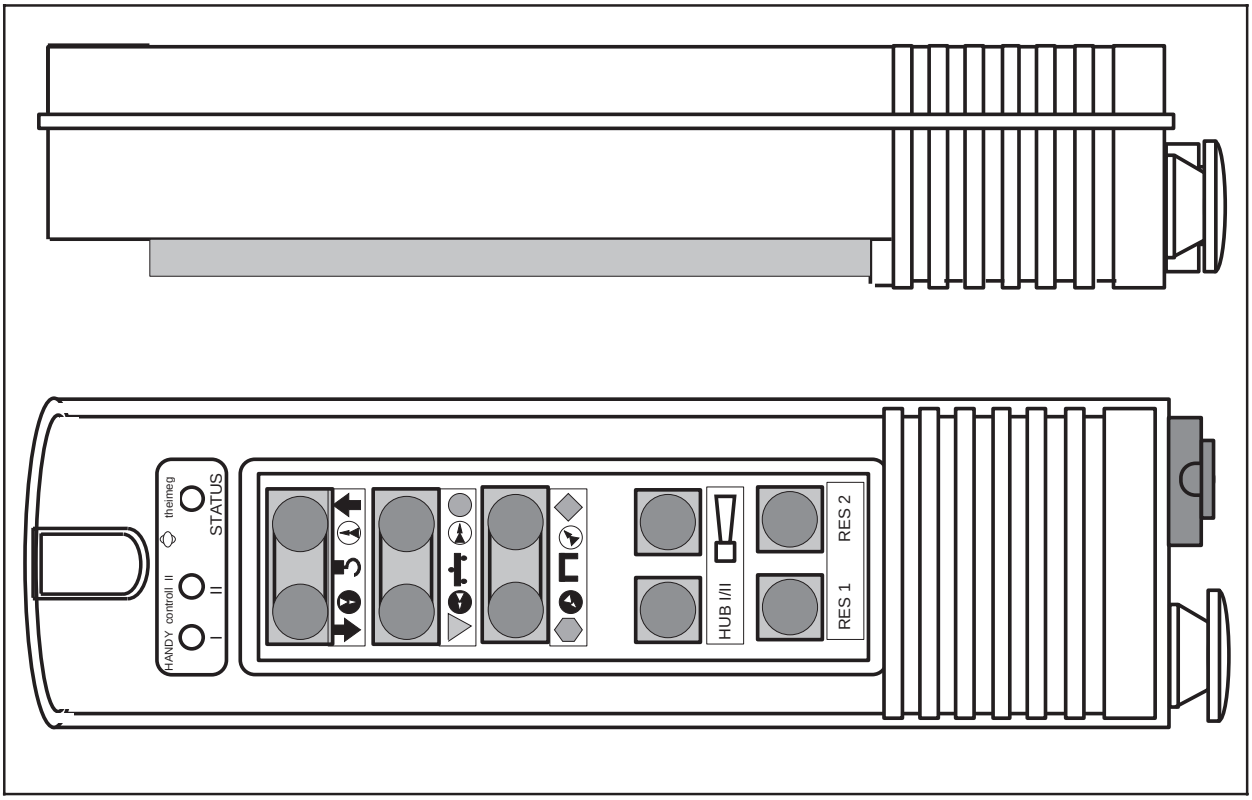
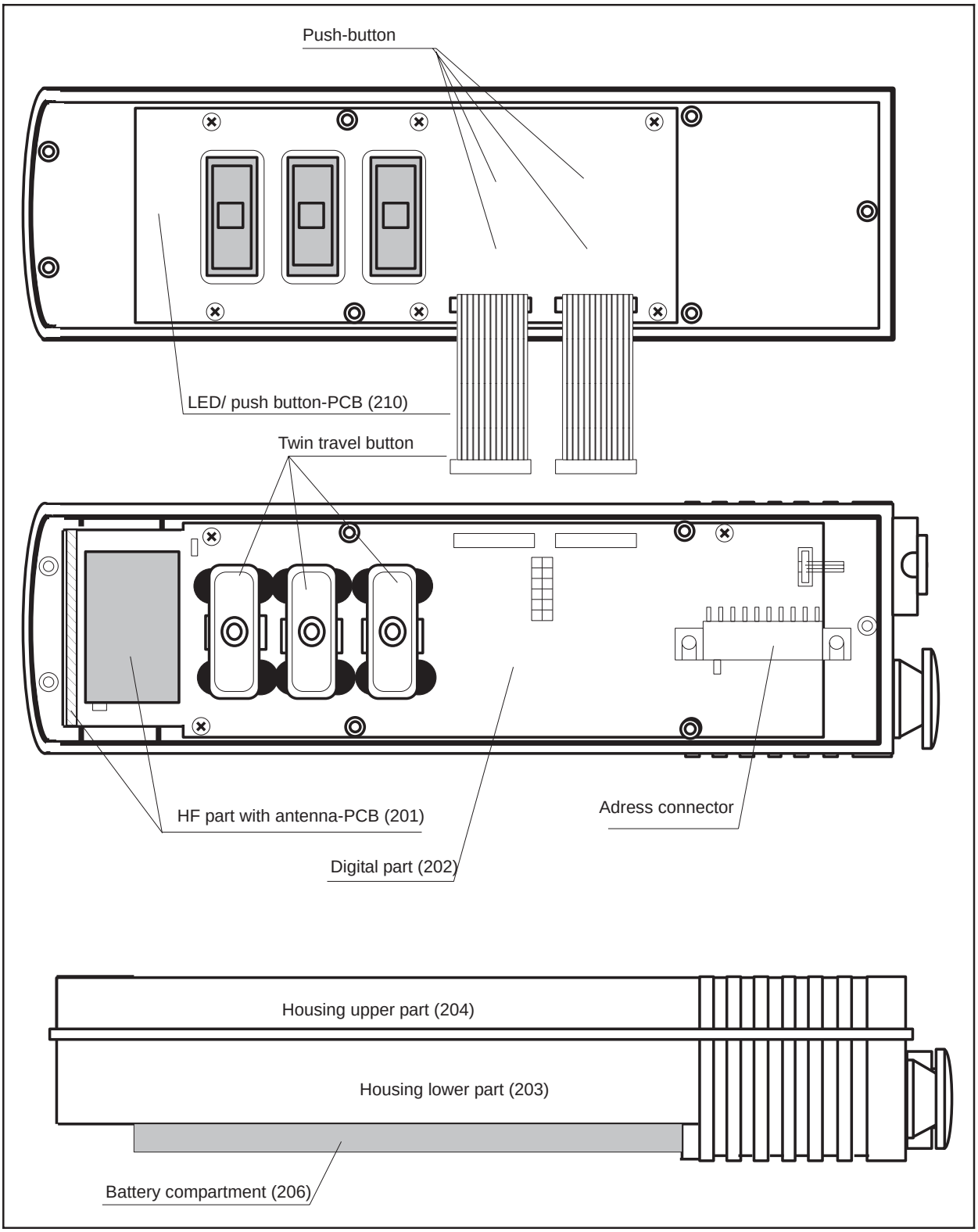
5 Structure of the system

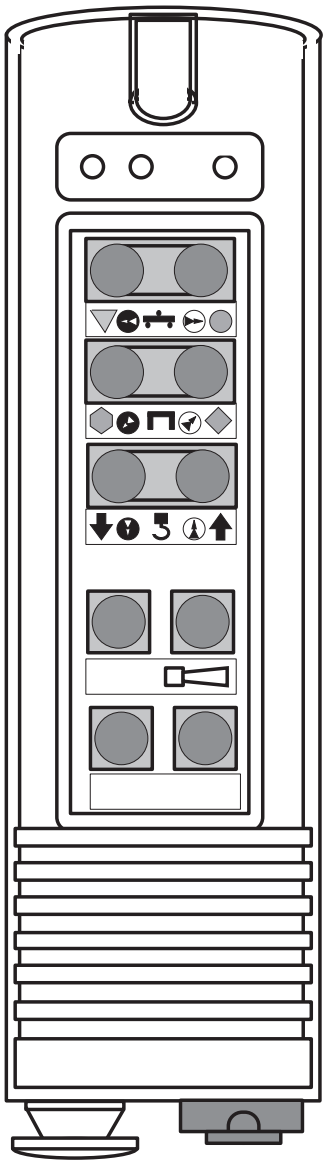
TRANSMITTER (200)



5.1 Structure of the transmitter



5.2 Transmitter controls



Key switch,
tumbler arrangement EB0001 (207)
Spare key,
tumbler arrangement ED0001 (208)

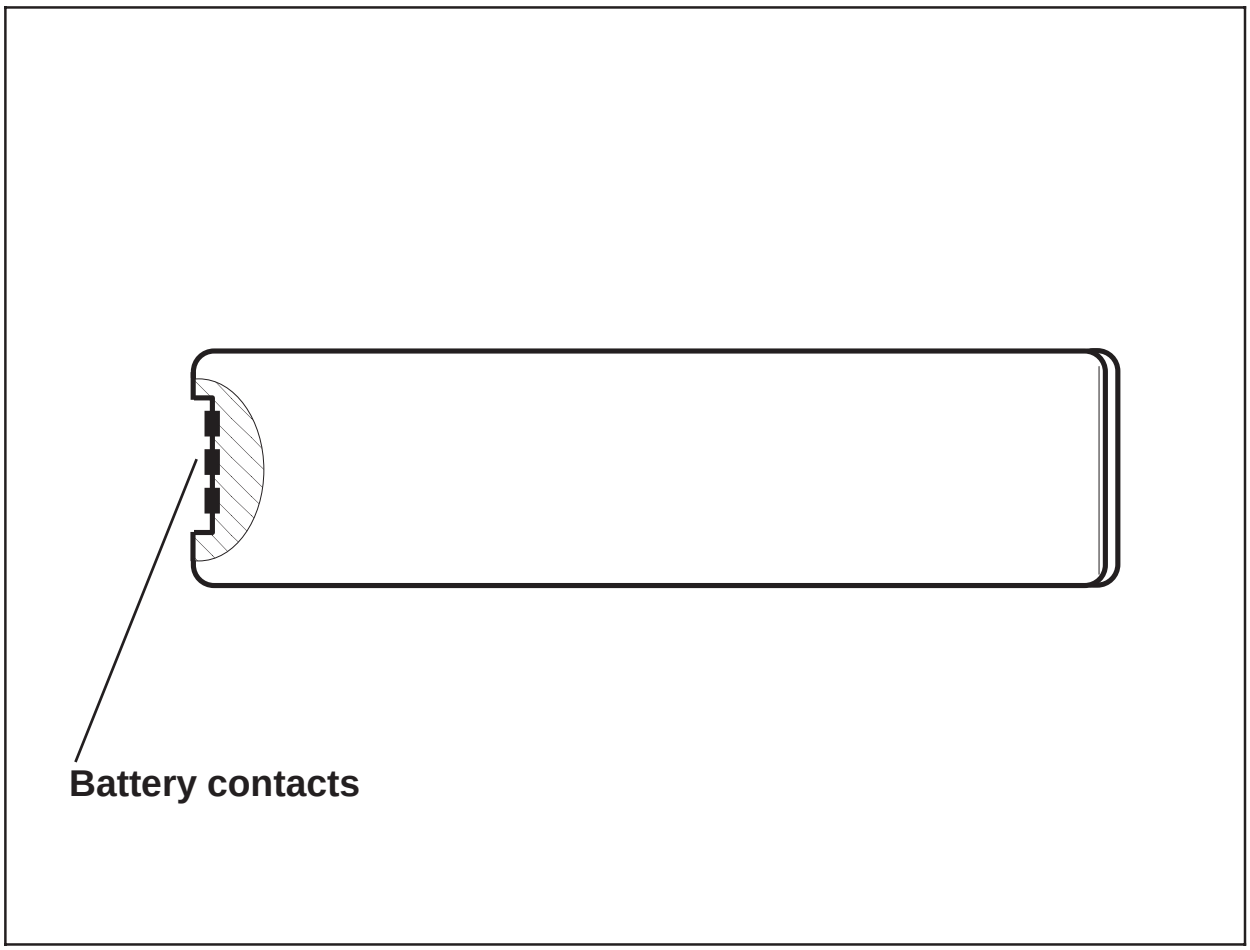
Mushroom-head push-button (209)

Rubber mat for push-button
and twin travel button

LED panel

5.3 Structure of the battery

Battery (300)



Service life of the battery

The service life of the battery depends on various factors:

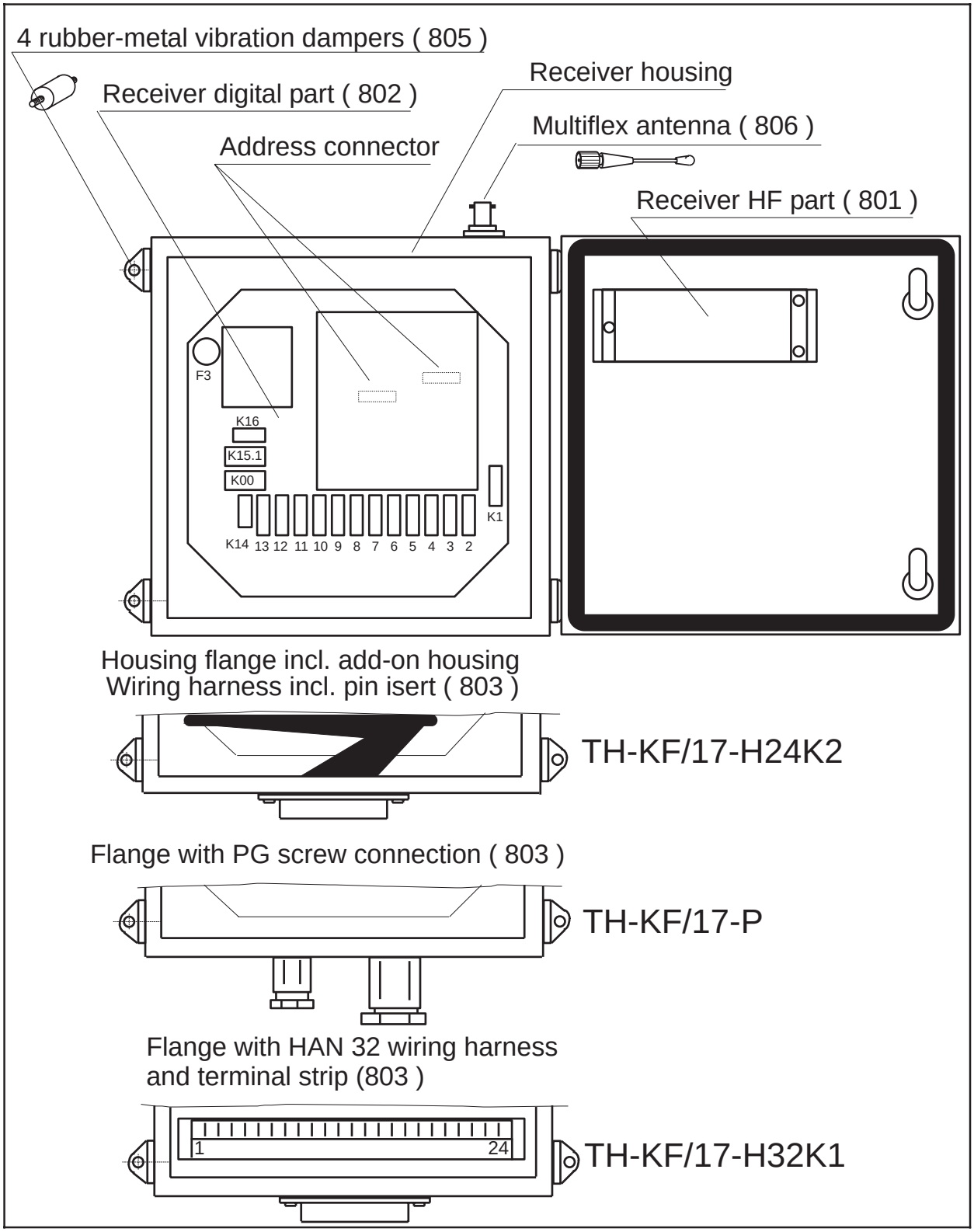
- ☐ Time during which the transmitter is switched on
- ☐ Operating frequency

The service life of the battery is extended if the transmitter is switched off when it is not working.

Under normal circumstances, the service life of the battery is between 5.5 hours and 8 hours.

As the charge in batteries which are not used runs down, the batteries must be recharged approx. every three months.

5.4 Structure of the receiver



5.5 Ordering of spare parts

The spare parts to be ordered have been listed in the previous chapters together with an serial number. The following sets out a list of spare parts for each device type in order to provide a better overview. The wear parts are also listed in this list of spare parts.

When ordering equipment, it is important to specify the system number and the frequency. Both items are detailed on the type plate.

THEIMEG	ELEKTRONIKGERÄTE GMBH & CO. D-41748 Viersen 1 Tel. 02162 / 372-0
Type:	Frequ.: 434,200 MHz
Oper. volt.:	FTZ- No.:
Address:	No.40.145-00221-324504

We recommend that you use the enclosed list of spare parts and enclose it with any order for spare parts as an annex to your order with details of specific quantities.

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	List of spare parts/order sheet HANDYcontrol System no. __ __ __ __ __ __ Frequency: _____MHz			
No.	**Article designation**	**Ordering no.**	**Quan-tity**	**Selling price**
	Transmitter TH-KF/17-HS			
200	Transmitter, complete, without address	**720119-1001S**		
201	Transmitter, HF part, with antenna	**System No.**		
202	Transmitter, digital part	**BE 001-02296**		
203	Housing, lower part	**BE 021-00070**		
204	Upper part with LEDs and buttons	**BE 021-00069**		
206	Rubber mat	**MT 006-00297**		
207	Key switch, tumbler arrangement EB00001	**LE 001-00001**		
208	Spare key, tumbler arrangement EB00001	**BE 022-00067**		
209	Mushroom-head emergency push-button	**BT 055-00251**		
210	LED/push button-PCB	**BE 022-00068**		
211	Standard text sheet	**HT 002-00253**		
212	Carrypocket with Waist Belt	**MT 006-00294**		
213				
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Prices on request

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	List of spare parts/order sheet HANDYcontrol II System no. __ __ __ __ __ __ Frequency: _____MHz			
No.	**Article designation**	**Ordering no.**	**Quan-tity**	**Selling price**
	Battery TH-			
300	Battery 7,2V 0,6Ah	**BE 023-00071**		
	Recharger TH-KF/LG-06			
400	Recharger, 230V version	**BE 023-00073**		
	Recharger TH-KF/PLG-06			
500	Processor-controlled recharger, 230V version	**BE 023-00086**		
501	Processor-controlled recharger, 115V version	**BE 023-00087**		
502	Processor-controlled recharger, 24V version	**BE 023-00088**		
	Receiver TH-KF/17-E1			
800	Receiver, complete, without address TH-KF/17-E1-P Receiver, complete, without address TH-KF/17-E1-H32K1 Receiver, complete, without address TH-KF/17-E1-H24K2	**720115-1002E** **720115-1001E** **720115-1011E**		
801	Receiver, HF part	**BE 001-02022**		
802	Receiver, digital part	**BE 001-01914**		
803	Housing flange incl. add-on housing for HAN32 Housing flange with PG-type screw connection Housing flange incl. add-on housing for HAN24	**BE 011-00030** **BE 011-00031** **BE 011-00038**		
804	Mating connector for BE 011-00030, complete Wiring harness and terminal strip for BE 011-00030 Wiring harness, incl. pin insert for BE 011-00038	**BE 013-00001** **BE 003-00174** **BE 003-00223**		
805	Rubber-metal vibration dampers	**MT 006-00048**		
806	Multiflex antenna TH-AN/07-MF-TNC	**BT 087-00035**		
	Antenna cable 5 m	**BE 004-00014**		
	Rod antenna 70 cm	**BT 087-00011**		
	Set of location designation plates	**HT 002-00197**		

Prices on request

5.6 Technical data

Frequency range:	433.1 to 434.75 MHz 70 cm band, frequency group F
Clock frequency:	2400 Hz (20 kHz) 1200 Hz (12.5 kHz)
Typical response time:	60 ms (at 2400 Hz)
Modulation:	FM
Signal coding:	PPM
Hamming distance:	d ≥ 6 (message check)
Transmission power:	20 mW
Receiver sensitivity:	<1µV 10dB (1 + S/N)
Digital electronics:	highly redundant twin microprocessor system
Operating temperature:	-20°C to +60°C
Receiver relay:	Output relay: max. 380 VAC/8A Main contactor: max. 380 VAC/6A
Ingress protection:	Transmitter IP54, receiver IP65
Transmitter dimensions and weight:	070 x 245 x 060 mm (WxHxD) 1.1 kg
Receiver dimensions and weight:	300 x 300 x 120 mm (WxHxD) 7.8 kg
Installation area:	400 x 500 (WxH)
Receiver operating voltage:	48, 62, 110, 230, 245VAC, 50/60 Hz, and 24 VDC
FTZ approval:	(TH Data HF)