

# **LIEBHERR**

## **Diagnostics manual**

### **LICCON 1**

## **Operating instructions**

**BAL-No.: 99900-11-02**

**Pages: 186**

Works-Number	
Date	

#### **ORIGINAL OPERATING MANUAL**

**The operating manual is part of the crane!**

**It must always be available within reach!**

**The traffic regulations and those for crane operation  
must be observed!**

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# Foreword

## General

This crane was built according to the state of technology and recognized safety technical regulations. Despite that, dangers to body and life for the user and / or third persons or damage to the crane and / or other material assets can occur.

This crane may only be used:

- in impeccable technical condition.
- for destined use.
- by trained personnel, which acts in a safety and danger conscious way.
- when no safety relevant problems are present.
- when no modifications were made on the crane.

Any problems, which could affect safety must be fixed immediately.

Modifications on the crane may only be made with written approval by Liebherr-Werk Ehingen GmbH.

## Data recording device

This crane is equipped with a data recording device. Among others, the following data is recorded:




- Date and time of day
- Entered configuration of the crane
- Actual load
- Percentage of utilization of the crane
- Working radius
- Main boom angle, luffing jib angle
- Total telescopic boom length, length of each telescopic section
- Every actuation of bypass devices

The recorded data can be read with a respective software.

## Safety and warning notes

Safety and warning notes are directed to all persons who work with the crane.


The terms **DANGER**, **WARNING**, **CAUTION** and **NOTICE** used in the crane documentation are intended to point out certain rules of conduct to all persons working with the crane.

Warn- ing signs	Signal word	Explanation
	<b>DANGER</b>	Designates a dangerous situation which will lead to death or serious injury if it is not prevented <sup>1)</sup>
	<b>WARNING</b>	Designates a dangerous situation, which can lead to death or serious injury if it is not prevented. <sup>1)</sup>
	<b>CAUTION</b>	Designates a dangerous situation, which can lead to slight or medium-grade injuries if it is not prevented. <sup>1)</sup>
	<b>NOTICE</b>	Designates a dangerous situation, which can lead to property damage if it is not prevented.

<sup>1)</sup> This could also result in property damage.

### Additional notes

The term **Note** is used in the crane documentation to make all persons working with the crane aware of useful information and tips.

Sign	Signal word	Explanation
	<b>Note</b>	Designates useful information and tips.

### Crane documentation

The crane documentation is comprised of:

- all supplied documents on paper and in digital form.
- all supplied programs and applications.
- all subsequently supplied information, updates and addenda for the crane documentation.

The crane documentation:

- makes it possible for you to operate the crane safely.
- supports you to utilize the permissible application possibilities of the crane.
- provides you with information about the functionality of important components and systems.



### Note

Terminology in the crane documentation.

Certain expressions are used in the crane documentation.

- In order to avoid misunderstandings, the same expressions should always be used.

Translations from the German version of the crane documentation: The crane documentation has been translated to be best of one's knowledge. Liebherr-Werk Ehingen GmbH assumes no liability for translation errors. The German version of the crane documentation is solely applicable for factual accuracy. If you find any errors or if any misunderstandings arise when reading the crane documentation, please contact Liebherr-Werk Ehingen GmbH immediately.

**WARNING**

Danger of accident due to incorrect operation of the crane!

Incorrect operation of the crane can lead to accidents!

Personnel can be killed or seriously injured!

This could result in property damage!

- ▶ Only authorized and trained expert personnel are permitted to work on the crane.
- ▶ The crane documentation is part of the crane and must be accessible on the crane.
- ▶ The crane documentation and on-site regulations and specifications (such as accident prevention regulations) must be observed.

Using the crane documentation:

- **makes it easier** to become familiar with the crane.
- **avoids** problems due to improper operation.

Observing the crane documentation:

- **increases** reliability in use.
- **extends** the service life of the crane.
- **minimizes** repair costs and downtime.

Place the crane documentation accessible in the driver's cab or in the crane cab.

**WARNING**

Outdated version of crane documentation!

If subsequently supplied information, updates and addenda to the crane documentation are not observed and added, there is a danger of accidents!

Personnel can be killed or seriously injured!

This could result in property damage!

- ▶ Observe and add all subsequently supplied information, updates and addenda for the crane documentation.
- ▶ Make sure that all affected persons always know and understand the latest version of the crane documentation.

**WARNING**

Crane documentation is not understood!

If parts of the crane documentation are not understood and the tasks are carried out on or with the crane, then there is a danger of accidents!

Personnel can be killed or seriously injured!

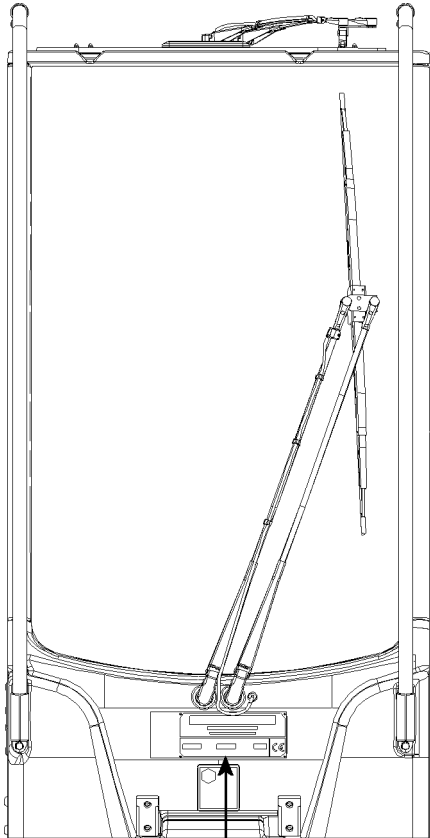
This could result in property damage!

- ▶ Clear up open questions regarding the crane documentation with Liebherr Service before carrying out the respective task.

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All accident prevention guidelines, operating instructions, load charts etc. are based on destined use of the crane.

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1



2



**CE marking**

The CE marking is a mark according to EU laws:

- Cranes with CE-marking according to the European machinery directive 2006/42/EC and the EN 13000! Data tag Crane with CE-marking, see illustration 1.
- Cranes which are operated outside the respective area of application do not require a CE marking. Data tag Crane without CE marking, see illustration 2.
- It is prohibited to market and operate cranes without CE marking, which do not meet the product-specific regulations valid in Europe, when a CE marking is specified for the country.
- It is prohibited to operate cranes with a tipping load utilization of 85 % which are programmed according to ASME B30.5 within the European Union or in countries which permit a lower stationary stability utilization (for example ISO 4305)! The national regulations apply. These cranes may not have a CE marking!

**Destined use**

The destined use of the crane consists solely in vertical lifting and lowering of free and non-adhered loads, whose weight and center of gravity are known.

To do so, a hook or hook block approved by Liebherr must be reeved on the hoist rope and it may only be operated within the permissible crane configurations.

Driving with the crane, with or without an attached load is only permissible if a corresponding driving or load chart is available. The set up configurations intended for it and the safety conditions must be observed according to the corresponding crane documentation.

Any other use or any other exceeding utilization is **not** destined use.

Destined use also includes the adherence of the required safety guidelines, conditions, prerequisites, set up conditions and working steps in the crane documentation (for example: Operating instructions, load charts, erection and take down charts, job planner).

The manufacturer is **not** liable for damages, which are caused by non-destined use or improper use of the crane. Any associated risk it is carried solely by the owner, the operator and the user of the crane.

### Non-destined use

**Non** -destined use is:

- Working outside the permissible set up configurations according to the load chart.
- Working outside the permissible boom radii and slewing ranges according to the load chart.
- Selecting load charts, which do not correspond to the actual set up configuration.
- Selection of a set up configuration via code or via manual entry, which does not correspond to the actual set up configuration.
- Working with bypassed / deactivated safety devices, for example bypassed load moment limitation or with bypassed hoist limit switch.
- Increasing the radius of the lifted load after a LMB shut off, for example by diagonally pulling the load.
- Using the support pressure display as a safety function against tipping over.
- Use of equipment parts which are not approved for the crane.
- Using the crane at sports and recreational events, especially for "Bungee" jumps and / or "Dinner in the sky".
- Driving on a public road in non-permissible driving condition (axle load, dimension).
- Driving with the equipment in place in a non-permissible driving condition.
- Pushing, pulling or lifting loads with the leveling regulation, the sliding beams or the support cylinders.
- Pushing, pulling or lifting loads by actuating the slewing gear, the luffing gear or the telescoping gear.
- Ripping stuck objects loose with the crane.
- Utilizing the crane for a longer period of time for material handling tasks.
- Releasing the crane suddenly (grapple or dumping operation).
- Utilizing the crane when the weight of the load, which is suspended on the crane is changed, for example by filling a container suspended on the load hook, except:
  - The load moment limiter was checked before for function with a known load.
  - The crane cab is occupied.
  - The crane is operational.
  - The container size is selected in such a way that an overload of the crane with full load is eliminated within the valid used load chart.

The crane may **not** be used for:

- Attaching a stuck load for which the weight and center of gravity are not known and which is released only by flame cutting, for example.
- Letting persons drive along outside the driver's cab.
- Transporting personnel in the crane cab while driving.
- Transporting personnel with the lifting equipment and on the load.
- Transporting of persons with work baskets (cherry pickers), if the national regulations of the responsible work safety organization are not observed.
- Transporting loads on the chassis.
- Two hook operation without auxiliary equipment.
- Extended material handling operation.
- Crane operation on a barge if the conditions are not determined and the written release by **Liebherr Werk Ehingen GmbH** is not present.

The crane documentation must be read and used by all persons who are involved in use, operation, assembly and maintenance of the crane.

### Safety systems

Special attention must be paid to the safety systems built into the crane. The safety systems must constantly be checked for functionality. The crane may not be operated if the safety systems are not working or not working correctly.



**Note**

Your motto must always be:

► **Safety first!**

The crane has been built in accordance with the applicable crane operation and driving regulations and has been approved by the relevant authorities.

**Equipment and spare parts****WARNING**

Danger to life if original equipment parts are **not** used!

If the crane is operated with equipment parts, which are **not** original, then the crane can fail and cause fatal accidents!

Crane components can be damaged!

- Operate the crane only with original equipment parts!
- Crane operation with equipment parts, which do **not** belong to the crane is prohibited!
- If there is any doubt about the origin of equipment parts, contact Liebherr Service!

**WARNING**

The crane permit and the manufacturer's warranty will become void!

If any original installed parts are modified, manipulated or replaced (e.g. removal of parts, installation of non-original Liebherr parts), both the crane permit and the manufacturer's warranty will become void.

- Leave installed original parts unchanged!
- Do not remove installed original parts!
- Use only Original Liebherr spare parts!
- If there is any doubt about the origin of spare parts, contact Liebherr Service!

For ordering equipment and spare parts, always keep the crane number handy and provide it.

**Definition of directional data for mobile cranes**

**Driving forwards:** Driving with the driver's cab on the front.

**Driving in reverse:** Driving with the taillights of the crane chassis on the front.

**Front, rear, right, left** in the **driver's cab** refer to the crane chassis. The driver's cab is always in the front.

**Front, rear, right, left** in the **crane operator's cab** refer to the superstructure. Front is always in direction of the placed down boom.

**Definition of directional data for crawler cranes**

**Driving forwards:** Driving forward from the view of the crane operator seated in the crane cab. Turntable in 0° or 180° position.

**Driving in reverse:** Driving backward from the view of the crane operator seated in the crane cab. Turntable in 0° or 180° position.

**Front, rear, right, left** always orient themselves on the **crawler track** from the position of the chain tension devices. The chain tension devices on the crawler track are always on the front.

**Front, rear, right, left** refer to the direction of view of the crane operator seated in the **crane cab**. Front is always in direction of the placed down boom.

**Optional equipment and functions**

The equipment marked with \* and the functions are optionally available and are **not** part of the standard crane (optional equipment).



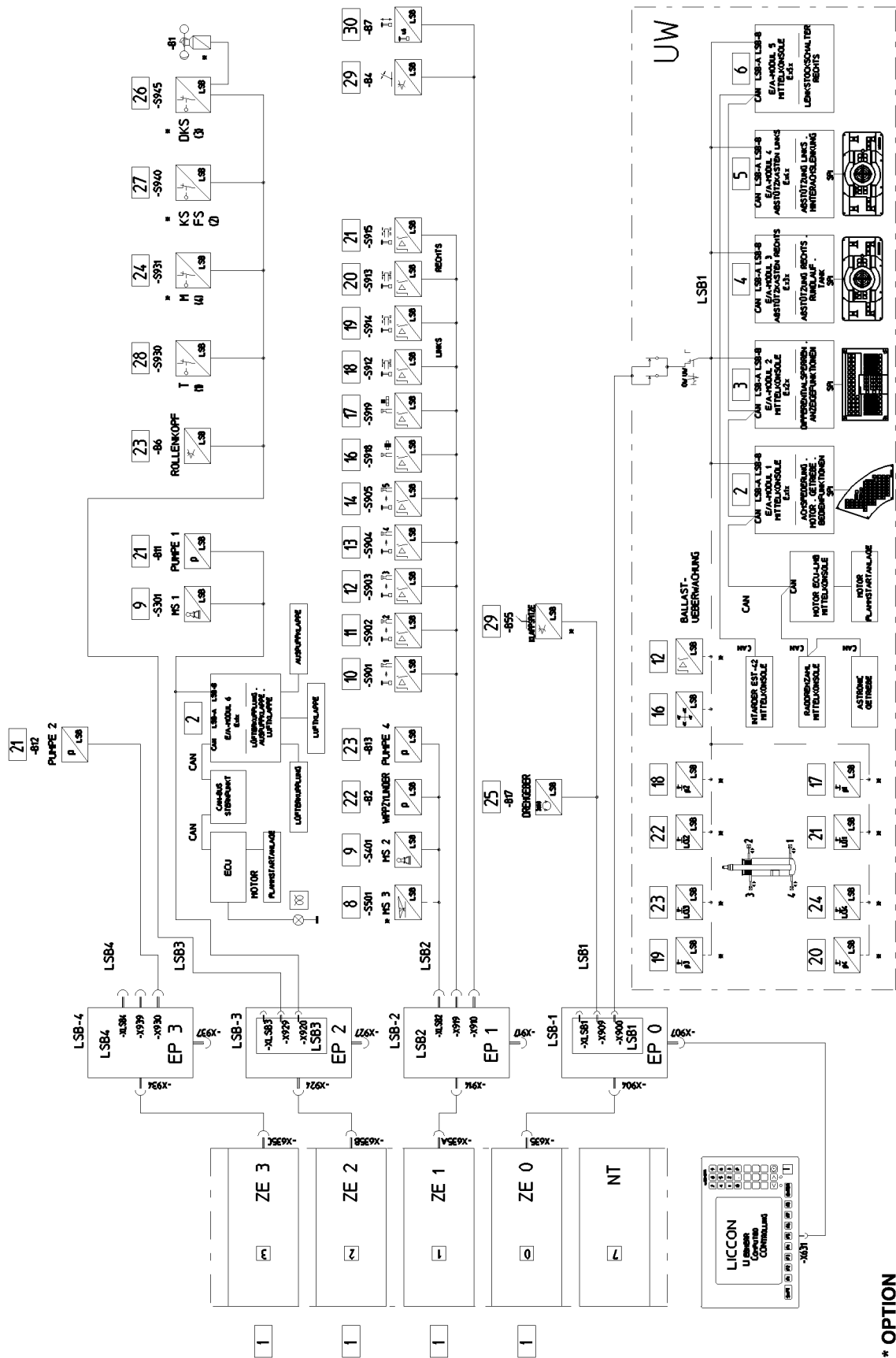
# Contents

<b>20 Diagnostics</b>	<b>13</b>
20.01 Overview Bus system	14
1 Overview Bus system	15
20.05 Error recognition - LICCON computer system	16
1 Error identification - LICCON computer system	17
20.09 Test system Bluetooth™ Terminal (BTT)	88
1 The BTT test system	89
2 Function determination in the BTT test system	90
3 Error information in the BTT test system	99
4 Settings in the BTT test system	101
5 Transferring error messages from the BTT test system to the BSE test system	103
6 Problems on the operating elements of the BTT and radio remote control (BTT-E)	107
20.10 Test system BSE	112
1 Multi-CPU test system	113
20.15 Remote diagnostics	162
1 Remote diagnostics*	163
20.20 Diagnostics – disk brake pads	168
1 The diagnostics - disk brake pads	169
20.25 Diagnostics - trailing axle	172
1 Trailing axle diagnostics*	173
20.30 Test system, TY-guying	176
1 Test system, TY-guying*	177
<b>90 Appendix</b>	<b>179</b>
90.01 Foreword to appendix	180
1 Preface	181
90.05 Update confirmation	182
1 Update confirmation	183
2 Customer information	183



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## 20 Diagnostics



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# 1 Overview Bus system



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**Note**

- ▶ The complete overview of the bus system (see illustration on opposite page), should give you an overview about the configuration, the modules used (CPU's, EP's, ... ) and their assignment on the LIEBHERR system bus (LSB).
  - ▶ The adjacent illustration should only be viewed as an example!
  - ▶ Depending on the design, type and execution of your crane, the LIEBHERR system bus shown in the adjacent illustration may vary from the LSB overviews of your crane. Detailed data for your crane can be found in the LSB overviews of the electrical circuit diagrams.
- 

**Explanation of terms:****CAN:**

Controller area network (differential data transmission via 2 conductors)

**LSB:**

LIEBHERR system bus (LSB1, ... , LSBn).

Data transmission between the individual modules using a three-wire bus.

**PU:**

Power unit

**CPU:**

Central processing unit (CPU0, ... , CPU<sub>n</sub>)

**IPCB:**

Input printed circuit board (IPCB1, ... , IPCB<sub>n</sub>)

**UW:**

Chassis

**OW:**

Superstructure

**BW:**

Ballast trailer





# 1 Error identification - LICCON computer system



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**Note**

- ▶ The monitor illustrations in this section are only examples. The error codes shown in the monitor illustrations and the corresponding error descriptions might not exactly match the crane.
  - ▶ Please note that all illustrations in this chapter are examples. They may not exactly match your crane.
- 



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**Note**

- ▶ Please note that the sections and hazard warning information relating to the crane chassis apply exclusively to LTM and LG cranes!
-

## 1.1 General

The errors which occur can be classified according to different criteria. The most frequently used description is identification according to the cause of the error.

The LICCON computer system encompasses a very large number of error diagnostics and self-monitoring routines. With some errors, it may therefore not be possible to determine exactly which component is defective.

Example: interrupted data transmission between two components:

- Each of the two components involved (for example, monitor or CPU, power unit or CPU, sensor or CPU) could be defective.
- The transmission circuit between the two (e.g. the monitor cable, module frame, sensor line or actuator line) could be defective.

Except for monitor errors and unique power unit errors, the errors will therefore not be classified according to the component that may be defective, but rather according to its corporate identity type. The errors are sequenced in the order that they are checked by the LICCON computer system:

### 1.) Monitor errors

- Indicate an error on the monitor at the start of operations or during operation
- Identification characteristic: a text or an unclear picture on the monitor

### 2.) Basic module errors

- Mostly occur due to errors on parts of the basic module (hardware or software)
  - Basic module errors are subdivided once again into the following sub-error groups:
- Unique power unit errors
  - indicate a defective power unit when the LICCON computer system is switched on
  - but can also be partially attributed to other causes
- Initialization errors
  - are identified by special test routines when the LICCON computer system is running up, for example microprocessor errors, hardware errors
  - are displayed on the 7-segment display of the CPU and possibly via a LICCON-Error-Code (LEC) and plain text on the monitor (error determination screen in program "Test system")
- System errors
  - are determined shortly after running up or during operation by the operating system of the LICCON computer system
  - system error programs particularly monitor the function of the electronics and data transfer
    - Fatal system errors
      - displayed on monitor with the LICCON-Error-Code and on the 7-segment display of the CPU
    - Other system errors
      - only displayed on the 7-segment display of the CPU

### 3.) Application errors

- are determined in the so called application programs (crane operation and telescoping)
- and incorporate a large number of sensor errors

### 4.) System errors (LEC)

- internal errors in I/O modules, applications, CAN bus errors, LSB errors etc.

### 5.) Operating errors (LEC)

- are determined due to incorrect operation (keypad unit, support control units, etc.)



#### Note

Displaying errors in the chassis

- ▶ This information applies to LTM and LG cranes only!
- ▶ In the **chassis**, system errors and operating errors are indicated by the warning light ! flashing on the display unit. Via the **i-key** on the keypad unit, the LICCON-Error-Code will be displayed on the 7-segment displays ! of the display unit for the duration of operation.

**Note**

Displaying errors in the superstructure

- ▶ This information applies to LTM, LTF, LG, LTR and LR cranes only!
- ▶ In the **superstructure**, application errors, system errors and operating errors are indicated on the operating screen and telescoping screen by an error message (flashing) and an acoustic signal (beeper, buzzer).

### 1.1.1 Locating and rectifying errors

The crane operator can use the error diagnostics facility to identify any errors that may have occurred. Together with the error description in the separate error list or the documentation of the error in the program "Test system", the error can in many cases be quickly located and rectified.

- ▶ If the LICCON-Error-Code displays an error:  
Consult the section "Error determination in the LICCON Test system" or the section "Separate error list".
- ▶ If the monitor display is defective:  
Consult the section "Monitor errors".
- ▶ If the operating display is not displayed or disappears suddenly:  
Consult the section "Basic module errors".

---

**NOTICE**

Danger of damage!

- ▶ If the crane operator cannot rectify the error himself: Consult LIEBHERR customer service.
- 

If the assistance of LIEBHERR customer service is required, please always provide the following information:

- crane type
  - crane number
  - full error code and any error message displayed on the monitor
  - in the case of basic module errors: also provide 7-segment displays from power unit and CPUs
  - usage conditions of crane
  - action during which the error occurs
  - frequency of error
- ▶ If the crane operator cannot rectify the error himself:  
Consult LIEBHERR customer service.

### 1.1.2 LICCON-Error-Code (LEC)

The LICCON-Error-Code describes four possible error classes:

- System errors
- Operating errors
- Application errors inc. error number
- Basic module errors (fatal system errors)

The error code will be displayed in both the chassis (display unit) and the superstructure (error determination display in the LICCON test system). In addition, all errors are listed in a separate error list (error text, cause, rectification).

The structure of the error code is based primarily on a 6 digit error number which is preceded by an error class identifier.

Error code: $\pm$ X. 12 34 56	
Element	Description
$\pm$	Active/inactive error
X.	Error class "B" / "E" (system error, application error, operating error)
12	Device (module generating the error)
34	Error path (source of error)
56	Type of error

There are different error classes:

- Operating errors "B":  
Error due to incorrect operation (keypad, ignition starter switch ...)  
for example **B. 4 9 9 8 9 8**
- System errors "E":  
Persistent errors, or briefly occurring errors (engine error, transmission error, module error ....)  
for example **E . 8 1 3 0 2 3**
- Application errors "E":  
Errors when operating crane (converting under load, hoist limit switch ....)  
for example **E. 0 3 0 0 5 9**
- Basic module errors "E":  
Errors in an electronic basic module (fatal system errors)  
**E. 0 0 0 0 5 1**

---

#### NOTICE

Deleting errors in the error vault!

Switching off the ignition will delete all error messages (active and inactive) stored in the error vaults.

► Apply caution when turning off the ignition.

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**1 OW**

**LIEBHERR**

L I C C O N  
FEHLERBESTIMMUNG **1.2** HC11 GRUPPE 0  
ZE 0

FEHLER	BESCHREIBUNG
+E010773* ZE 0:	Ausgang 7
08:11/ 1	Offener Stromkreis oder Kurzschluss nach Versorgungsspannung bzw Masse
+E030059 ZE 0:	LMB
09:44/20	Laengengeber defekt zum Verbolzzeitpunkt, Teelaenge unguelteig

**1.3**

-E010073 ZE 0: Ausgang 0  
10:25/15 Offener Stromkreis oder Kurzschluss nach Ver  
98-08-05 >P0: 0020h >P1: 012Ch >P2: 094Ch >P3: 5821h

ALLE/1. LOESCHEN PARAMETER EIN/AUS FEHLER/ZE HC11+TMS FEHLER EAMh FEHLER-SPEICHER MEH

SHIFT F1 F2 F3 F4 F5 F6

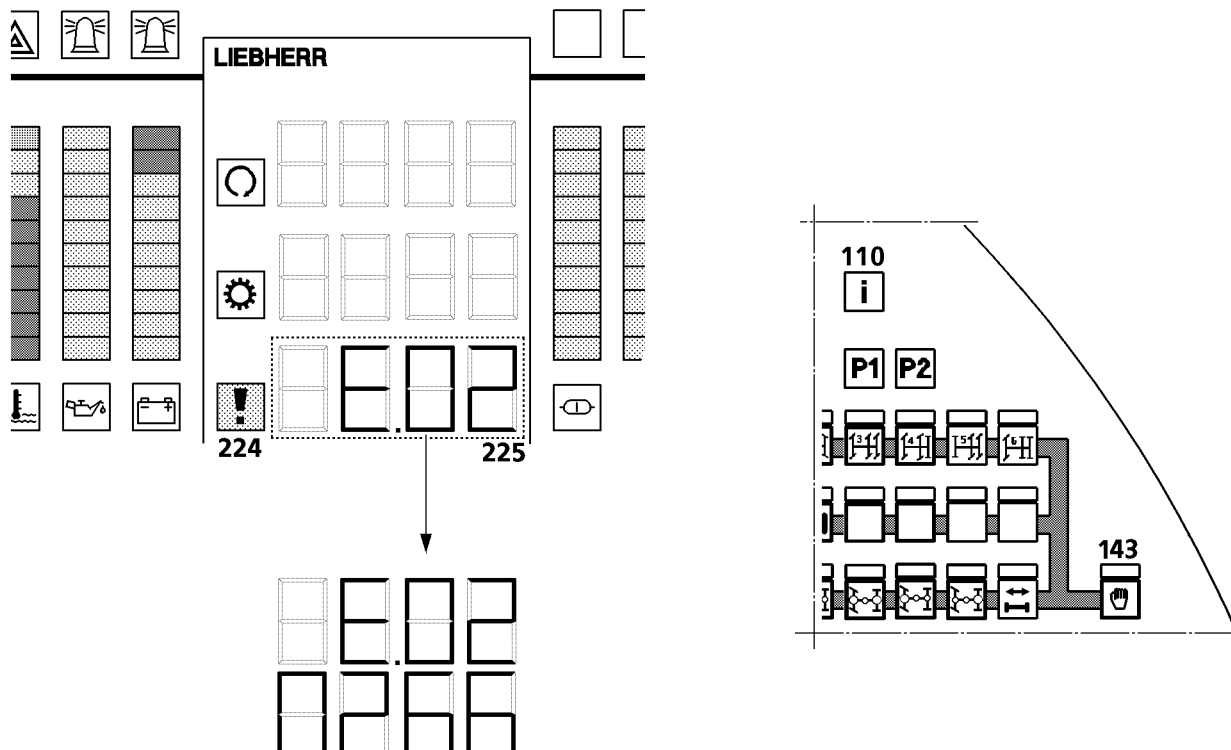
**1.1**

F7 F8 ENTER

45.0  
92 92 92 92

48.0  
60.0°  
84.6

E:0HC11

**2 UW**

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### Displaying errors in the superstructure

If there is a system error, application error or operating error, an error message **1.1** will appear in the program "Crane operation", "Telescoping" or "Support" in the symbol element "Horn" on the LICCON monitor.

The error will be displayed by:

- the error class "E" =system error/application error or "B" =operating error
- the relevant CPU
- the processors of the CPU (TMS or HC11) or the relevant I/O module

Example, system error ( illustration **1.1**):

Error code: E:OHC11	
Element	Description
E:	Error class
0	CPU
HC11	I/O module and number, or processor of CPU

### NOTICE

Danger of property damage!

► In the case of fatal system errors, please also note the 7-segment displays on the CPUs.

► Press function key **F8** once.

#### Result:

- Horn is switched off.

► Press function key **F8** twice.

#### Result:

- Change to Error determination screen **1.2** in program "Test system".
- The page of the error vault on which the error is stored appears. The error is displayed as a 6 digit LEC and documented. Active errors are identified by a "+".

Inactive errors can be displayed using function key **F2** in subprogram "PARAMETER ON" **1.3**. Identification in this case is "-". You can find more information on inactive errors in the section "System errors", "Superstructure".

► If inactive errors are to be displayed:  
Press function key **F2**.

### Displaying errors in the chassis (UW) (only for LTM and LG cranes)

If there is a system error "E", the warning light **224** on the display unit flashes. Via the **i**-key **110** on the keypad unit, the LICCON-Error-Code (LEC) on the display unit **225** will be alternately displayed for the duration of the operation.

This means that the entire LEC will be alternately displayed by:

- error class
  - "E" =system error/application error
  - "b" =operating error
- the 6-digit error number

Example, system error (active error - illustration **1.1**):

<b>Error code: E. 02 0266</b>	
<b>Element</b>	<b>Description</b>
-	Active/inactive error (exc. active error sign)
E.	Error class (system error)
02 0266	Error number

If an operating error is caused while a system error is pending the warning light **224** illuminates. The operating error "b" appears automatically on the display unit **225**.

- If several active errors are present at the same time:  
Press the **i**-key **110** again.

**Result:**

- All existing active errors will be displayed.
- Once all existing errors have been displayed "End" appears on the display unit **225**. By pressing the **i**-key **110** again, the first error will be displayed once more.

Inactive errors can be displayed by pressing the Hand button **143** and the **i**-button **110** on the display unit **225** at the same time. Identification in this case is "-". You can find more information on inactive errors in the section "System errors", "Chassis".

- If inactive errors are to be displayed:  
Press the Hand button **143** and the **i**-button **110** simultaneously.

### 1.1.3 Separate error list

The errors are listed in the separate error list. Error class "K" and error priority "W" are given in the last two columns of the error list.

Error no.	generated text/cause/remedy	Plug	Sheet	K	W
121351	CPU 1: LSBA station 13 was not... Entry of error in error memory or... Configuration problem, load new software.	X919:4		E	2
121353	CPU 1: LSBA station 13 no longer answering... Entry of error in error memory, station... Check connection, if connection OK then	X919:4		E	1
121354	... ... ...	...		.	.

Plug = Plug description of component

Page = Page in electrical diagram

K = Error class

W = Priority of error

**A differentiation is made between two error classes:**



Error class	Meaning
B	Operating errors
E	System errors Application errors Basic module errors (fatal system error(s))

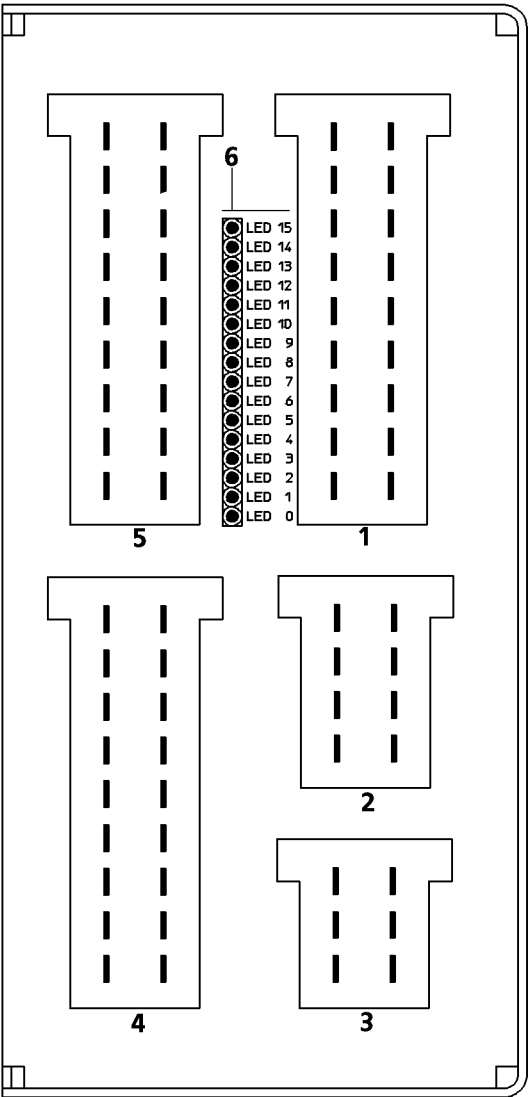
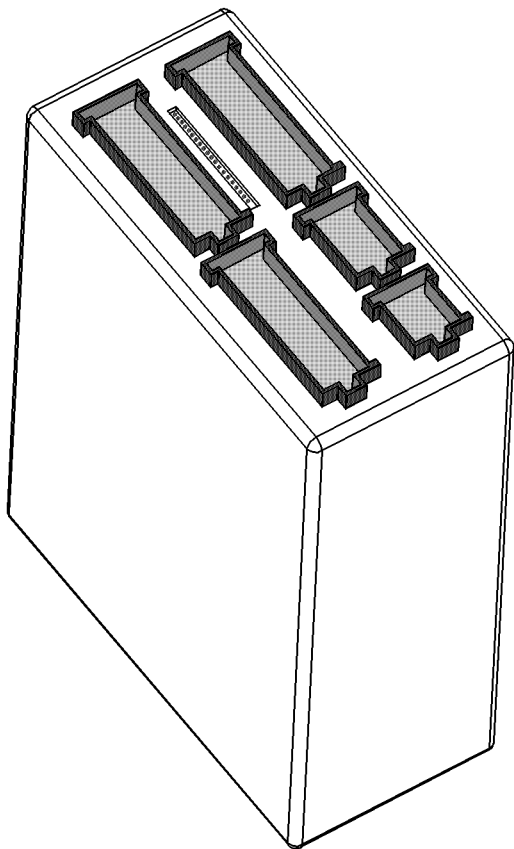
A differentiation is made between 3 error priorities:

Error priority	Meaning
0	Tolerable error
1	Rectify error immediately
2	Turn off device immediately!

**Note**

Error priority for operating errors!

► For operating errors, error priority is **not** relevant.



### 1.1.4 LED error code and status display on I/O modules

Inputs and constant current sources **1**

SPI bus **2**

CAN bus **3**

Voltage supply **4**

Inputs, outputs, LSB bus **5**

LED	Colour	Module	Error/status	Meaning	
				static	blinking
15	red	HW watchdog	Error	no error (LED 50% bright) operating status	intermittent error
14	red	HW error	Error	change I/O module	-
13	yellow	HW error	Status	output stage defective	-
12	yellow	HW error	Status	initialization <sup>1</sup>	-
11	yellow	HW error	Status	Appl.-/driver watchdog	Illegal Interrupt
10	green	-	-	-	-
9	green	-	-	-	-
8	green	-	-	-	-
7	red	LSB1 driver	Error	persistent error on LSB1	intermittent interruption on LSB1
6	yellow	LSB1 driver	Status	LSB 1 bus off	download via LSB1
5	red	LSB2 driver	Error	persistent error on LSB2	intermittent interruption on LSB2
4	yellow	LSB2 driver	Status	LSB2 bus off	download via LSB2
3	red	CAN driver	Error	persistent error on CAN	intermittent interruption on CAN
2	yellow	CAN driver	Status	all stations missing on CAN	one/several stations missing on CAN
1	red	SSC driver	Error	persistent error on SSC	intermittent interruption on SSC
0	yellow	SSC driver	Status	-	-

<sup>1</sup> Error in: register, RAM, ROM, output stage watchdog, firmware, crane configuration file



B197882

## 1.2 Monitor errors

Monitor errors:

- could indicate a defective monitor when switching on the control system
- could stem from errors in the basic module
- could stem from a shortage in monitor supply voltage (in this case the monitor stays dark)

The light-emitting diode (LED) I, which is located on the right at the bottom of the monitor will indicate whether the monitor's voltage supply (24 V) is present.

The run-up must progress as shown in illustration 1 to illustration 3. When switching on the LICCON computer system, the connection from the monitor to the central processing unit (CPU) is tested first. If the connection is OK, the monitor displays:

```
=> DATA LINE CHECK PASSED  --  O.K.  !!
    SYSTEM CHECK  .......
```

B197915

If the connection is defective, the monitor displays:

```
=> DATA LINE FAILURE !!
```

B197916

or

```
=> >>> CRT Selftest ERROR: Host Interface: Break!
```

B197917

### 1.2.1 Locating and rectifying monitor errors

The following index shows possible monitor errors, their possible causes and possible methods of rectifying them.

The monitor errors are presented in the order that the crane operator or the LICCON computer system identifies them.

Rectify the errors in the sequence given as follows.

Error	Possible cause
Monitor remains dark when switching on - LED I does <b>not</b> illuminate	No power supply
	Overload cut-out is switched off

Possible rectification of error (follow given order for rectifying error):

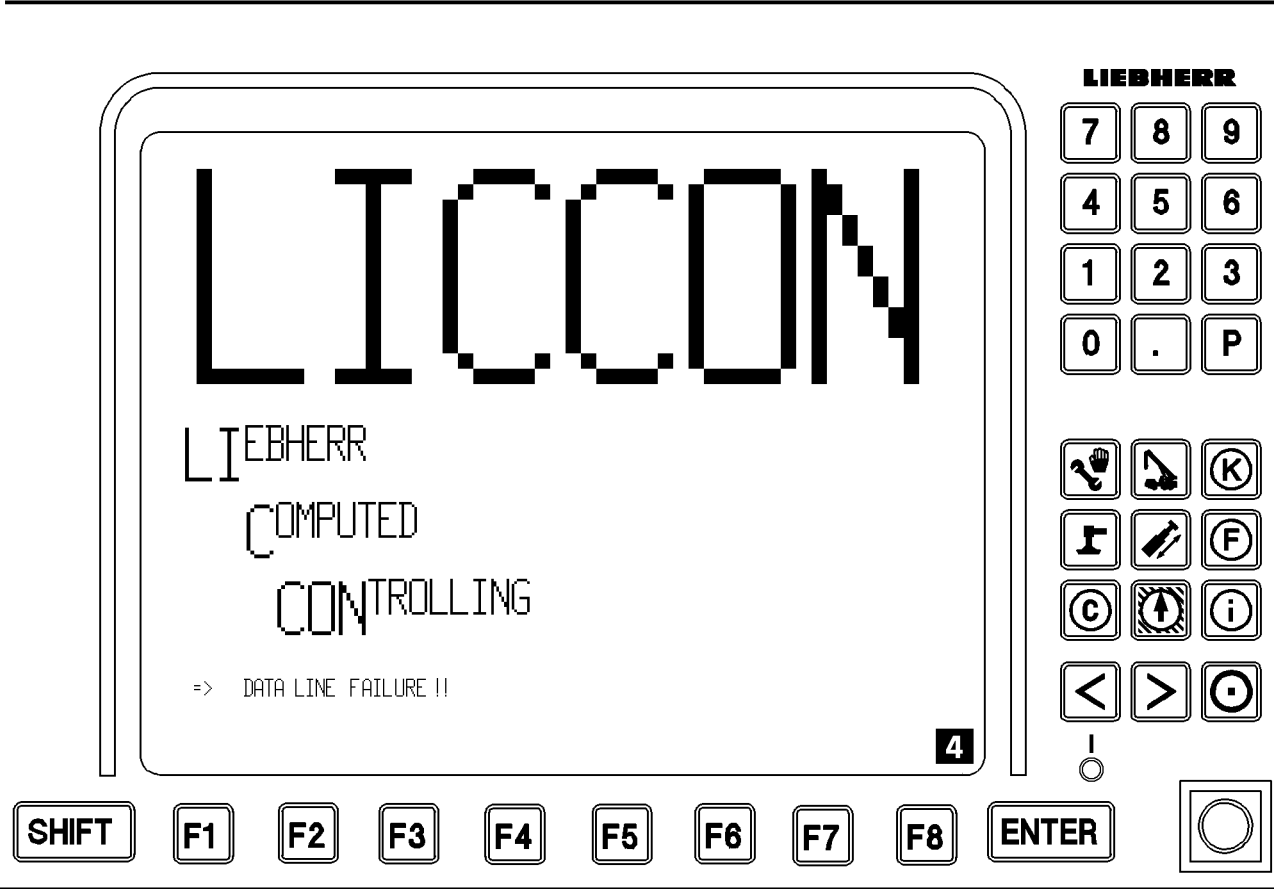
- Check the power supply.
- Operate the overload cut-out for monitors.

Error	Possible cause
No picture on monitor	Monitor switches the screen off at external temperatures less than -20 °C and greater than 70 °C
	Supply to monitor is unplugged or faulty
	Monitor is defective

Possible rectification of error (follow given order for rectifying error):

- ▶ Preheat or cool the cab.
- ▶ Replace the defective LICCON monitor by a functioning replacement monitor (see section "Replacing the monitor").
- ▶ Check the supply voltage (V) on the monitor connection plug (setpoint: 18 V - 36 V, nominal: 24 V).

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Error	Possible cause
When switching on, monitor displays error text from illustration 4 - LED I does <b>not</b> illuminate.	Monitor is defective
	Monitor to CPU connection (via IPCB) has no power supply
	CPU defective

Possible rectification of error (follow given order for rectifying error):

- ▶ Open the control cabinet and check the CPU display.

If the CPU display



B197918

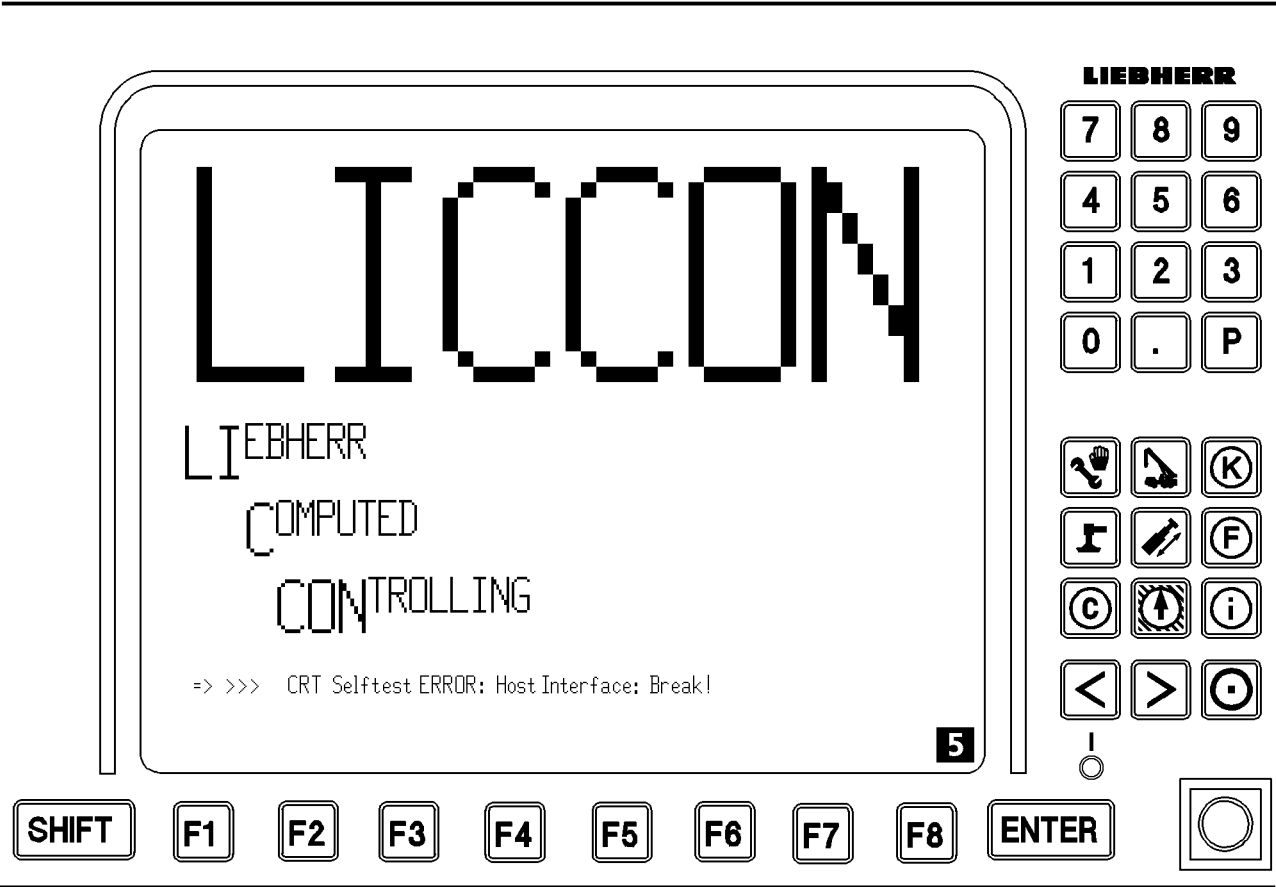
is shown



B197919

flashing:

- ▶ Check the connection of the CPU to the input PCB and the connection of the input PCB to the monitor for interruption.
- ▶ If the connections are OK:  
Check the CPU of the monitor and error display and replace if necessary.
- ▶ If this flashing display is **not** shown on the CPU display after switching on:  
Check the CPU or program memory card and replace if necessary (see section "Locating basic module errors", "Checking the CPU").
- ▶ Replace the defective LICCON monitor with a functioning replacement monitor.



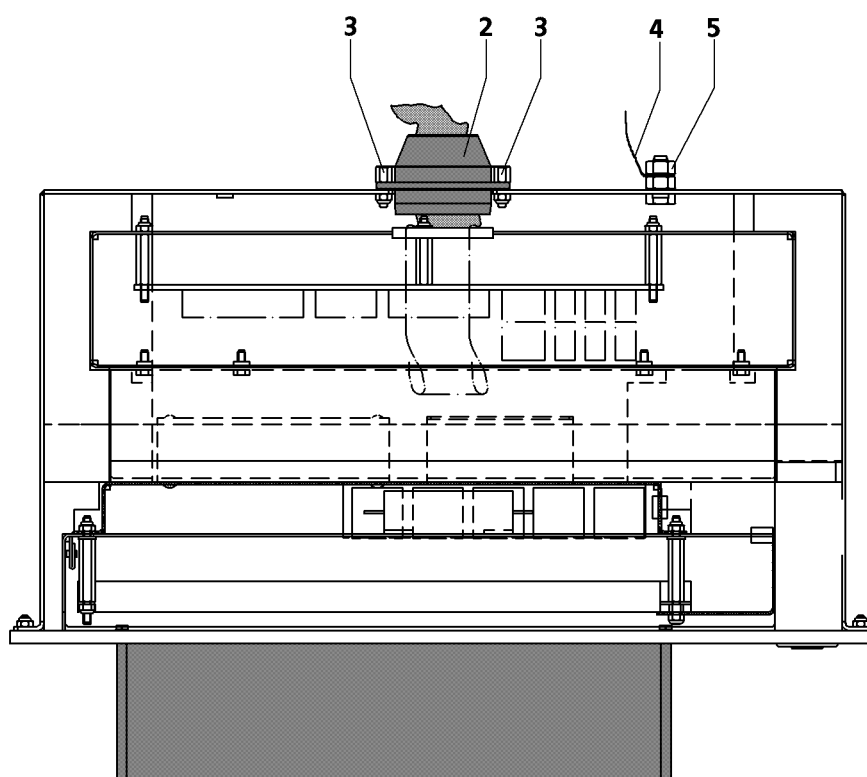
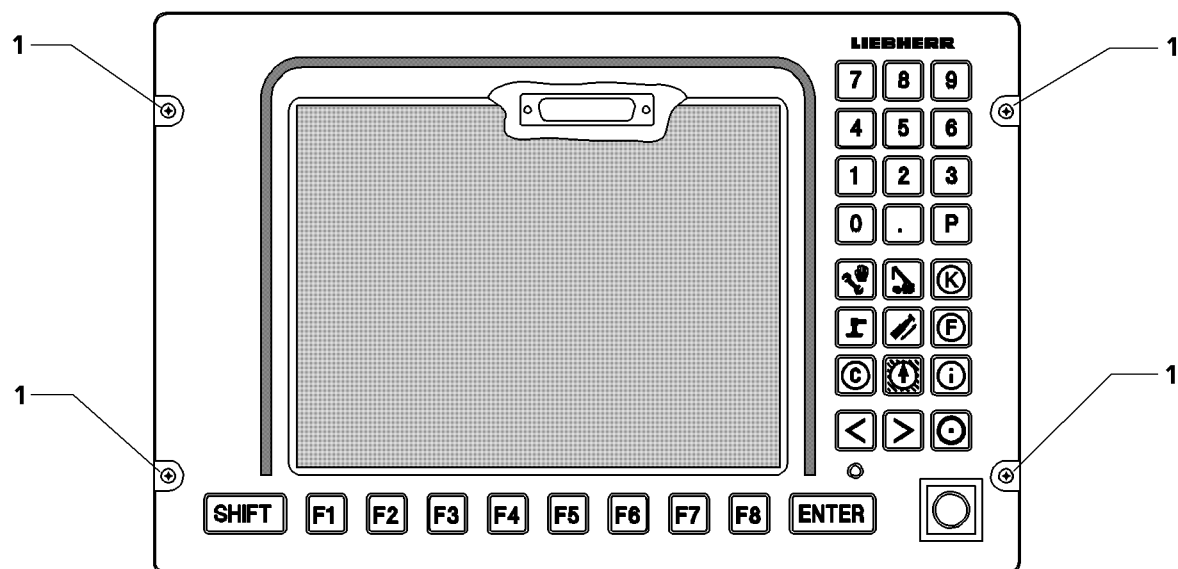
Error	Possible cause
When switching on, monitor displays error text from illustration 5	Monitor is defective
	Connection defective
	Power unit defective
	CPU defective

Possible rectification of error (follow given order for rectifying error):

- ▶ Replace the faulty monitor with a functioning replacement monitor.
- ▶ If the replacement monitor displays the same error message:  
Open the control cabinet and test the power unit.
- ▶ If the power unit display does **not** display "7" when switched on:  
see section "Basic module errors", "Unique power unit errors"
- ▶ If the power unit display displays "7" after switching on:  
Power unit is OK. Check the connection from the CPU to the input PCB and the connection from the input PCB to the monitor for interruption.
- ▶ If the connections are OK:  
Check CPU0.

Error	Possible cause
Monitor displays one of the following errors after switch-on: Monitor horn does not work Sealed keypad defective Brightness control defective Bypass key button defective Symbol elements incorrect or missing	Individual monitor components (display, keypad, bypass key button) defective

- ▶ Replace the faulty monitor with a functioning replacement monitor.



## 1.2.2 Replacing the monitor

### Dismounting the monitor

The monitor can easily be replaced using simple tools.



#### WARNING

Danger of fatal injury when operating crane without monitor display.

- ▶ Replace the defective LICCON monitor.
- ▶ Turn off the crane's engine.
- ▶ Unscrew the mounting screws **1** in the front plate on the monitor.
- ▶ Take out the monitor.
- ▶ On the monitor connection cable **2**, unscrew the bolt connections **3** and unplug the connector **2**.
- ▶ Unscrew screw **5** and release the ground lead **4** of the monitor.

### Fitting the replacement monitor

- ▶ Tighten the ground lead **4** of the monitor and screw the screw **5** tight.
- ▶ Plug in the connector **2** on the monitor connection cable **2** and screw the bolt connections **3** tight.
- ▶ Place the monitor in the instrument panel.
- ▶ Screw the mounting screws **1** in the front plate on the monitor tight.

## 1.3 Basic module errors

Basic module errors are errors that are usually caused by errors in parts of the basic module (hardware).

Basic module errors are divided into the following sub-error groups:

- 1.) Unique power unit errors
- 2.) Initialization errors
- 3.) System errors (other system errors)



#### Note

LIEBHERR customer service information!

- ▶ Even if the crane can be repaired without external assistance, please inform LIEBHERR customer service precisely about the error display shown in the case of each basic module error (unique power unit errors, initialization errors or system errors).






#### Note

Causes of errors and methods of error rectification in the charts!

- ▶ Regrettably, the possible causes of errors and methods of error rectification given in the charts cannot be complete due to the complexity of the system. They are designed to provide information which can be used to repair the crane without external assistance in straightforward cases.

### 1.3.1 Unique power unit errors

Externally, the power unit looks very similar to the CPUs. However, the power unit is always inserted on the extreme left. During normal operation, the 7-segment display on the power unit shows the displays from the following chart.

Power unit display during normal operation		
Power unit display	Type of display	Meaning
	static	Control is off  Battery power is present at the basic module, stand-by power supply for memory (CPU RAMs and COMMON RAMs) is present <b>Note:</b> Must also illuminate when ignition is off.
	static	Control is on  Battery power present at basic module, power unit is OK
	static	Control is on  Battery power present at basic module, power unit is OK  This means that all CPUs receive this signal and display "P" as confirmation on their displays. If this switching forward is not working: After restarting the program, the LMB with the smallest load chart and zero reeving will be displayed on the LICCON monitor.

Power unit errors:

- indicate a defective power unit when the LICCON computer system is switched on
- but can also be attributed to other causes

Power unit errors can only be observed when switching on or operating by looking at the power unit display when the control cabinet is open.

The following chart describes possible power unit errors.


Rectify the errors in the sequence given as follows.



#### Note


Remedying basic module errors!

- The section "Locating basic module errors" describes the identification of basic module errors in detail and provides a systematic procedure for remedying them. Testing and replacing the power unit is also described there.

Unique power unit error			
Power unit display	Type of display	Error description and error text	Possible causes of error
	static	Error ANZ7_E	error not tolerable


Possible rectification of error (follow given order for rectifying error):

- ▶ If possible:  
When switching on next, note error entry in CW7.104 - CW7.177.
- ▶ Inform LIEBHERR customer service.
- ▶ If the error continues to occur after switching on several times:  
Replace power unit.

Unique power unit error			
Power unit display	Type of display	Error description and error text	Possible causes of error
	static	Over/undervoltage ERROR_VOLT-AGE	Controller defective


Possible rectification of error (follow given order for rectifying error):


- ▶ Check supply voltage and replace power unit if necessary.


Unique power unit error			
Power unit display	Type of display	Error description and error text	Possible causes of error
	-	no U-BATT	no battery power


Possible error rectification:

- ▶ Check supply voltage and replace power unit if necessary.


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	Timeout  PIC-Watchdog	PIC defective	<b>Note:</b> If the error continues to occur after switching on several times: <b>Replace power unit</b>


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	PIC-Error 1	start/stop bit missing	<b>Note:</b> If the error continues to occur after switching on several times: <b>Replace power unit</b>


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	PIC-Error 2	optocoupler defective	Replace power unit as soon as possible, inform <b>LIEBHERR</b> customer service.


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	PIC-Error 3	under/overvoltage or HC11 watchdog	<b>Note:</b> If the error continues to occur after switching on several times: <b>Replace power unit</b>





Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	Timeout Load LCA	CPU0 missing	Check whether CPU0 is present. Check connection CPU, bus PCB, power unit. <b>Note:</b> Maintain error rectification sequence!


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	CRC-Error	Memory error	Replace power unit.


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	inadmissible mode	defective cabling D+, 15, control ON, ..	Check cabling.


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	common memory missing	insert card missing	Insert card.


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	Warning	see error entry in CW7.104 - CW7.111	See description, error entry in CW7.104 - CW7.111.


Warning lights flashing			
Power unit display	Error text	Possible causes of error	Possible remedy for error
		Test operation (protocol mode)	Switch off test operation. <b>Note:</b> The actual error number is shown after the letter "F "


Error during software update			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	FLASH defective	FLASH module defective	Remove upload card and insert original insert card. Replace power unit if necessary. <b>Note:</b> Maintain error rectification sequence!

Error during software update			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	FLASH not clear	FLASH module defective	See power unit display F5.

Error during software update			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	FLASH Timeout Polling	FLASH module defective	See power unit display F5.

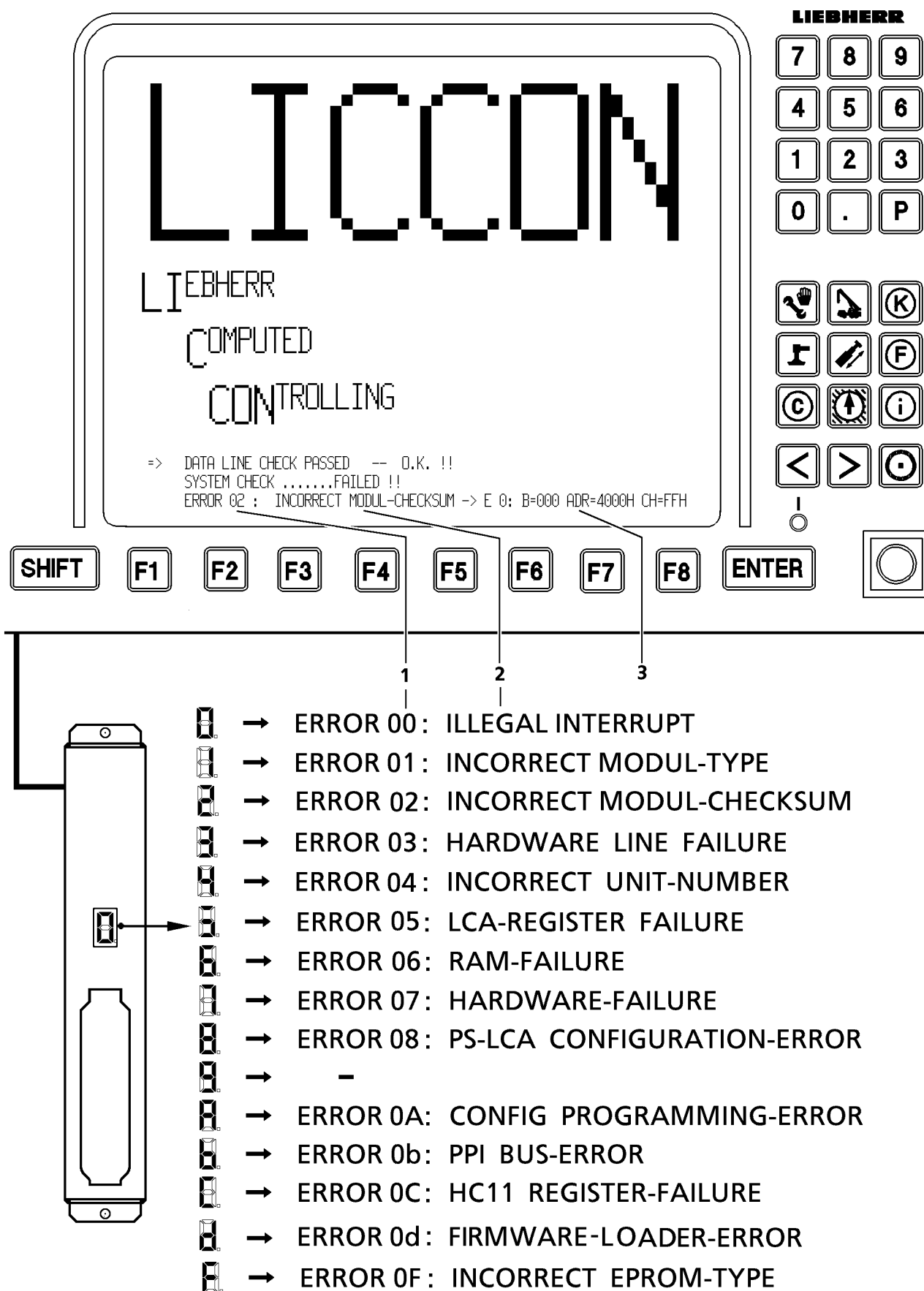
Error during software update			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	FLASH Timeout Erase	FLASH module defective	See power unit display F5.

Error during software update			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	insert card defective	incorrect insert card	See power unit display F5.

Error during software update			
Power unit display	Error text	Possible causes of error	Possible remedy for error
	inadmissible error number	internal error	See power unit display F5. <b>Note:</b> For further power unit errors see error entry in CW7.104 – CW7.111



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B197886

### 1.3.2 Initialization errors

Initialization errors are hardware errors which are determined during run-up and automatic check by special test routines of the LICCON computer system. They are displayed by a **flashing** initialization error sign (number or sign) on the 7-segment display of the CPU.

The initialization error is always located with the assistance of the CPU display. Possible initialization error signs and information about the possible causes of error and possible remedies for the errors are listed in the following chart. The crane operator must always open the control cabinet and observe the CPU displays in the event of initialization errors and system errors.



---

**Note**

Remedying basic module errors!

- ▶ The exact procedure for remedying basic module errors is described in the section “Locating basic module errors”.
- 

- ▶ If an initialization error occurs on a CPU to which **a monitor** is connected:  
The error will (if time permits) be displayed additionally on the monitor.

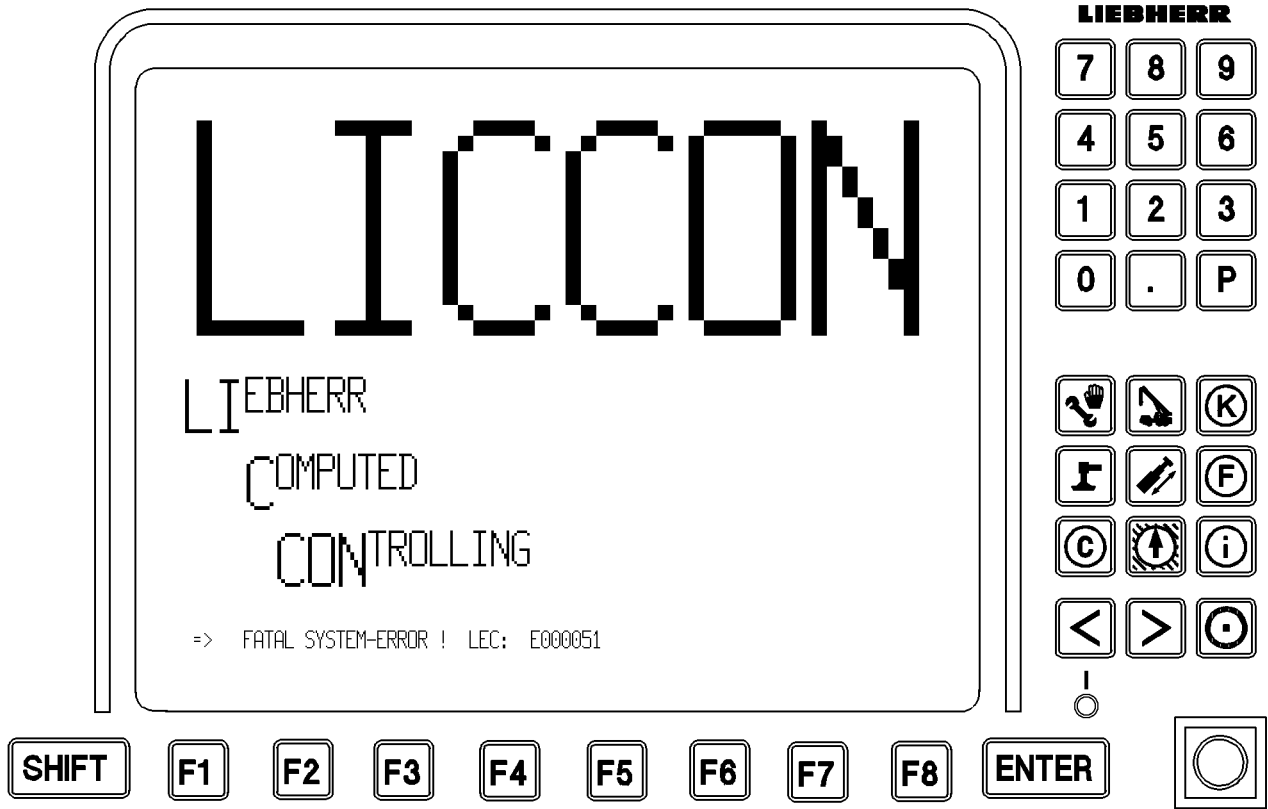
**Result:** Display:

- 1.) Error number (=initialization error number) corresponds to CPU display
- 2.) Error description text
- 3.) Partially further information in form of values of relevant memory cells

- ▶ If an initialization error occurs on a CPU to which **no monitor** is connected:  
The error will at first not be visible on the monitor.

**Result:**

- The LICCON computer system continues to run briefly.
  - At this point, however, the initialization error generates a system error as a subsequent error which stops the execution of the program and is displayed on the monitor (see “System errors”).
- ▶ If a **hardware error** occurs during operation:  
System error will be displayed and the monitor display freezes or becomes dark (see “System errors”).





### 1.3.3 System errors (basic module errors)



#### WARNING

Crane functions interrupted in the event of system error!

If a system error occurs:

- All control programs and therefore all crane functions will be interrupted.



#### Note

LIEBHERR customer service information!

- Even if the crane can be repaired without external assistance, please inform LIEBHERR customer service precisely about the error display shown in the case of each error.

Errors in the electronic basic module which are identified by the system shortly after run-up of the LICCON computer system or when operating. These programs monitor in particular the function of the program execution and the data transfer. System errors can be subsequent errors which could only be determined during initialization.

If a system error does not occur as the subsequent error of an initialization error, the hardware is probably OK.

To a large extent, system errors have to be rectified by trained LIEBHERR customer service personnel. However, these instructions also provide information on how the crane can be repaired by testing or replacing components of the LICCON computer system.

System errors are always located using the CPU display and error determination in the program "Test system". In the case of initialization errors and system errors, the CPU display must always be observed, see the section "Locating basic module errors".

System errors are grouped into:

- 1.) Fatal system errors (FATAL SYSTEM-ERROR):  
Displayed on monitor and CPU
- 2.) Other system error numbers:  
Displayed on the CPU display unit

#### Fatal system errors (basic module errors)

Fatal system errors are displayed on the monitor with the LICCON-Error-Code (LEC).

The display **FATAL SYSTEM-ERROR !** appears on the monitor together with the relevant LICCON-Error-Code **LEC: Exxxxxx**




#### Note

CPU display!

The CPU displays for brightness control are switched off approx. every 10 milliseconds for a further 10 milliseconds.


- After the system-stop of a system error, there is a 50% likelihood of the display of a subsequent error being displayed on other CPU displays.
- There is a 50 % likelihood that this display will go out.

At the same time, one of the following CPU displays will appear on the CPU which first identifies the error:

System errors			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	FATAL SYSTEM-ERROR has occurred (CPU not 0)	error will be displayed on monitor

Possible error rectification:

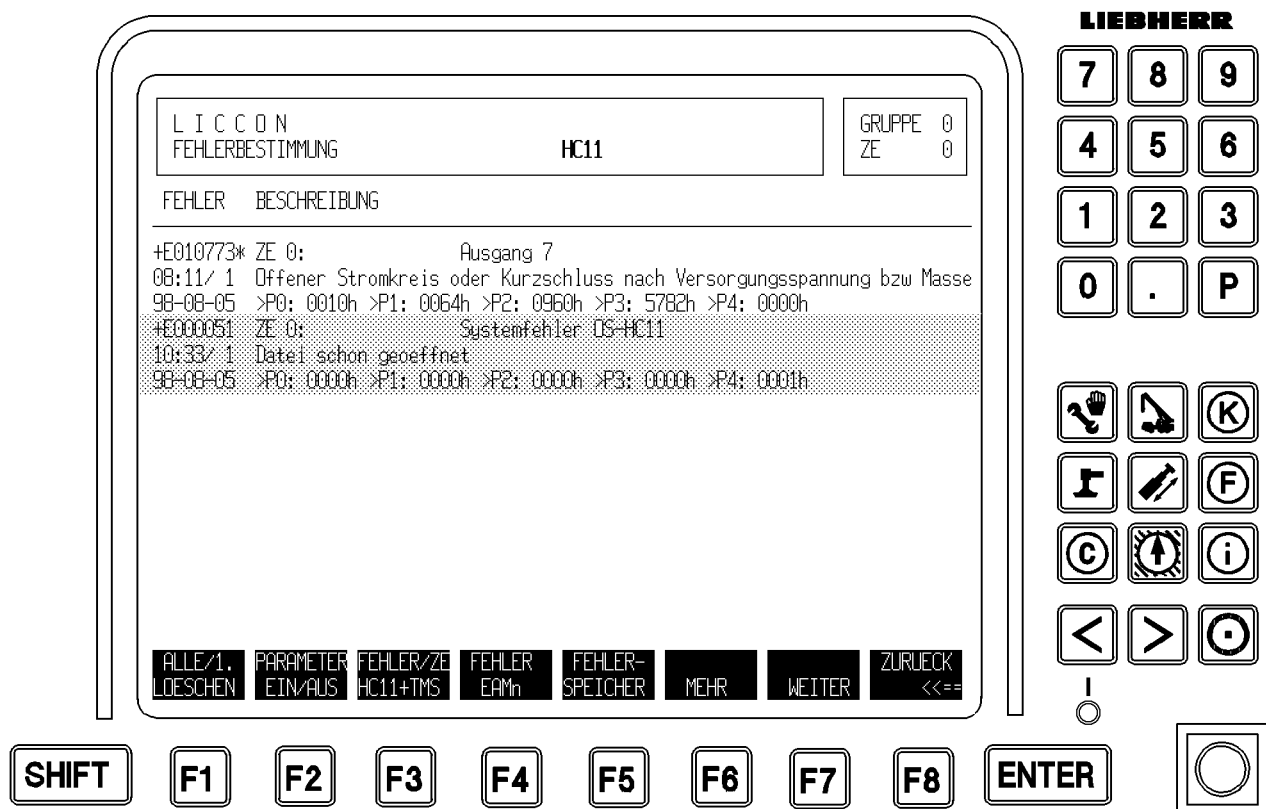
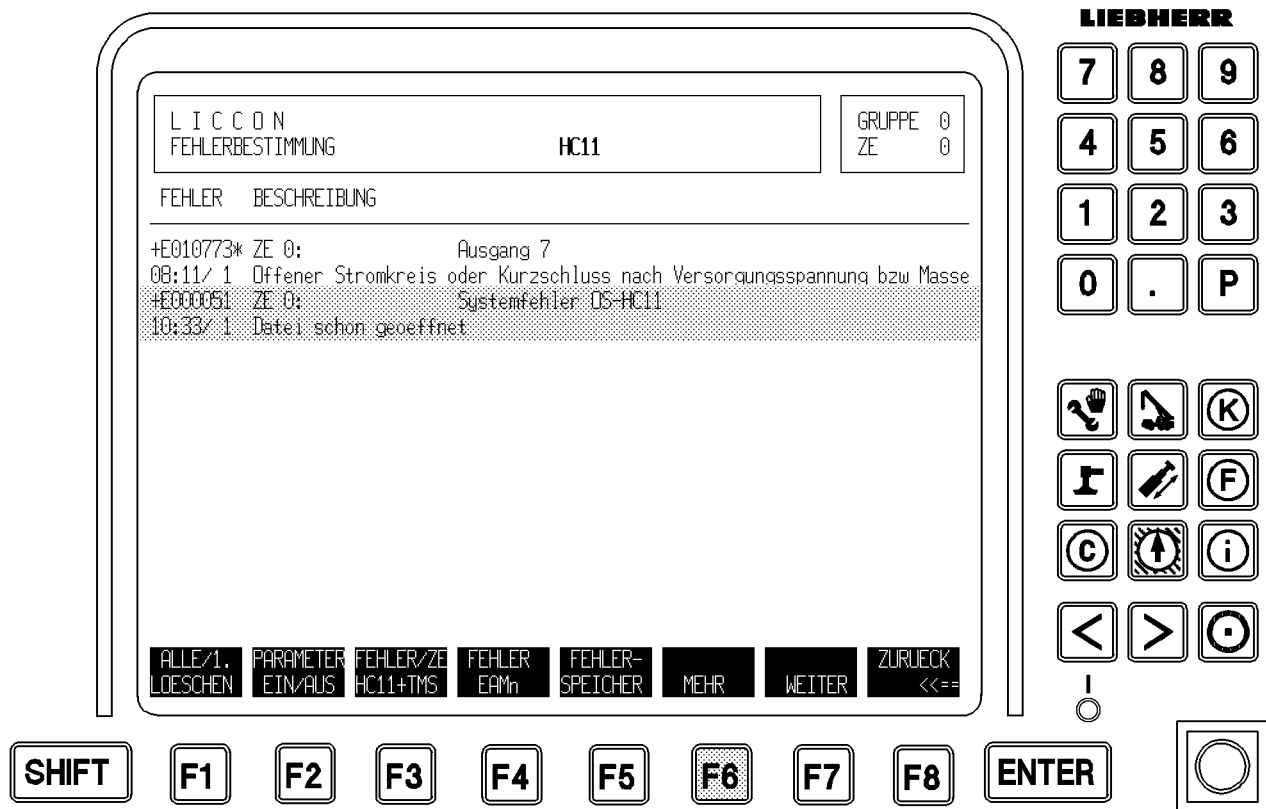
- see error description, test system

System errors			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	FATAL SYSTEM-ERROR has occurred and global reset (CPU=0)	error will be displayed on monitor

Possible error rectification:

- see error description, test system

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To change to the program "Test system" proceed as follows:

- ▶ Switch off LICCON computer system.
- ▶ Switch LICCON computer system back on after approx. 5 seconds.

**Result:**

- The subprogram "Error determination" of the LICCON test system will automatically appear (see Fig. above). The system error will be documented there with a 6-digit number.

- ▶ Press **F2** key.

**Result:**

- Call-up of subprogram "PARAMETER ON/OFF". Error-specific data as well as the date the error occurred can be read off (see illustration below).

- ▶ Press **F6** key.

**Result:**

- Call-up of subprogram "MORE". Other errors from the error vault can be read off.

It is not possible to change back to other LICCON programs directly via the program keys.

- ▶ Switch off LICCON computer system.
- ▶ Switch LICCON computer system back on after approx. 5 seconds.

**Other system errors (basic module errors)**


Other system errors are only differentiated from fatal system errors in that no monitor error display appears. The monitor can no longer be described by the type of error for these system errors.

Typical signs of other system errors on the monitor are e.g.:

- the monitor display freezes
- the monitor display goes dark
- the monitor display is disturbed


Other system errors can also be subsequent errors of other errors. If the monitor stays dark, the error can only be defined using the CPU displays. The procedure for searching for these errors is exactly the same as for searching for fatal system errors (see section "Locating basic module errors").

The chart "Other system errors" describes the errors according to their displays on the CPU display. The chart provides information on possible causes of error and possible error rectification methods.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	-	CPU display dark:	CPU defective
		no power supply	check fuse
		program memory card missing or defective	program memory card was not inserted
		CPU defective	


Possible error rectification:

- ▶ Check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	HC11 defective	CPU defective
		inadmissible interrupt in the initialization phase	


Possible error rectification:

- Check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	Module type faulty:	program memory card defective
		EPROM incorrect/defective	CPU defective
		program memory card incorrect/defective	

Possible error rectification:

- Check program memory card or CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	Module checksum faulty:	program memory card defective
		EPROM defective	CPU defective
		program memory card defective	

Possible error rectification:

- Check program memory card or CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
<b>3</b>	blinking	hardware error (line test)	CPU defective

Possible error rectification:

- Check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
<b>4</b>	blinking	Invalid CPU number:	program memory card defective
		incorrect EPROM	CPU defective
		program memory card defective	


Possible error rectification:

- Check program memory card or CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
<b>5</b>	blinking	LCA register faulty	CPU defective
		LCA defective	Power unit defective
		power unit status incorrect	
		module carrier faulty	


Possible error rectification:

- Check CPU, check power unit.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	RAM error	CPU defective
		RAM defective	


Possible error rectification:

- Check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	Hardware error:	CPU defective
		arithmetic processor (APU) defective	
		HC11 defective	
		AD-converter defective	
		DA-converter defective	

Possible error rectification:

- Check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	Power unit LCA charging error:	Power unit defective
		LCA on power unit defective	
		module carrier defective	

Possible error rectification:

- Check power unit.



Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
9	blinking	monitor faulty	Monitor is defective
		line from monitor to CPU faulty	line defective
		CPU faulty	CPU defective

Possible error rectification:

- Check monitor, line and CPU, see section "Basic module errors".

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
8	blinking	"CONFIG" -Programming Error	CPU defective
		HC11 defective	
		CPU defective	


Possible error rectification:

- Replace CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
b	blinking	bus controller error	Power unit defective
		common memory card in power unit missing	common memory card or CPU defective
		module carrier faulty	


Possible error rectification:

- Check common memory card, check power unit, check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	HC11 hardware error	CPU defective
		AC-converter defective	
		CPU defective	


Possible error rectification:

- Check CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	firmware loader error	program memory card defective or incorrect software status
			CPU may be defective


Possible error rectification:

- Replace program memory card or software, replace CPU.

Errors on the central processing unit			
CPU display	Type of display	Error description, poss. causes of error for customer service	Possible causes of error
	blinking	Incorrect EPROM type: P=Program-EPROM=E0, C=Charts-EPROM=E1 (1st letter of directory)	program memory card incorrect/defective
		EPROM switched/defective	CPU defective
		program memory card switched/defective	

Possible error rectification:


- Check program memory card, check CPU.

Other system errors			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	watchdog appeared and global reset	program flow error <sup>1</sup>  CPU defective

<sup>1</sup> Program flow error: Program flow interrupted by an error.

Possible error rectification:

- Check CPU.


Other system errors			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	recursive error, PPI bus driver and global reset (interrupt logic may be defective)	program flow error <sup>1</sup>  system overload <sup>2</sup> CPU defective

<sup>1</sup> Program flow error: Program flow interrupted by an error.

<sup>2</sup> System overload: The maximum permitted times for program run-through, data transfer etc. can no longer be maintained due to an error.


Possible error rectification:

- Check CPU, check power unit.

Other system errors			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	clock monitor fail and global reset	CPU defective
		oscillator defective	
		CPU defective	


Possible error rectification:

- Check CPU.

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	temporary	firmware being loaded	Appears at first start.
		<b>Note:</b> central segment flashing	New TMS software being loaded.


Possible error rectification:

- Status indicator

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	FATAL SYSTEM-ERROR has occurred (CPU not 0)	error will be displayed on monitor


Possible error rectification:

- see error description, test system

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	FATAL SYSTEM-ERROR has occurred and global reset (CPU=0)	error will be displayed on monitor


Possible error rectification:

- see error description, test system

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	blinking	no monitor connected to CPU	Monitor is defective  line defective CPU defective


Possible error rectification:

- Check monitor, check line, check CPU.

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	blinking	TxD/RxD shorted  monitor line test with jumper plug	display only during monitor line test


Possible error rectification:

- no

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	temporary	CPU0 has identified "control OFF" (from PU P) and recovered data.	Display frozen: power unit error
		then system shut down	

Possible error rectification:

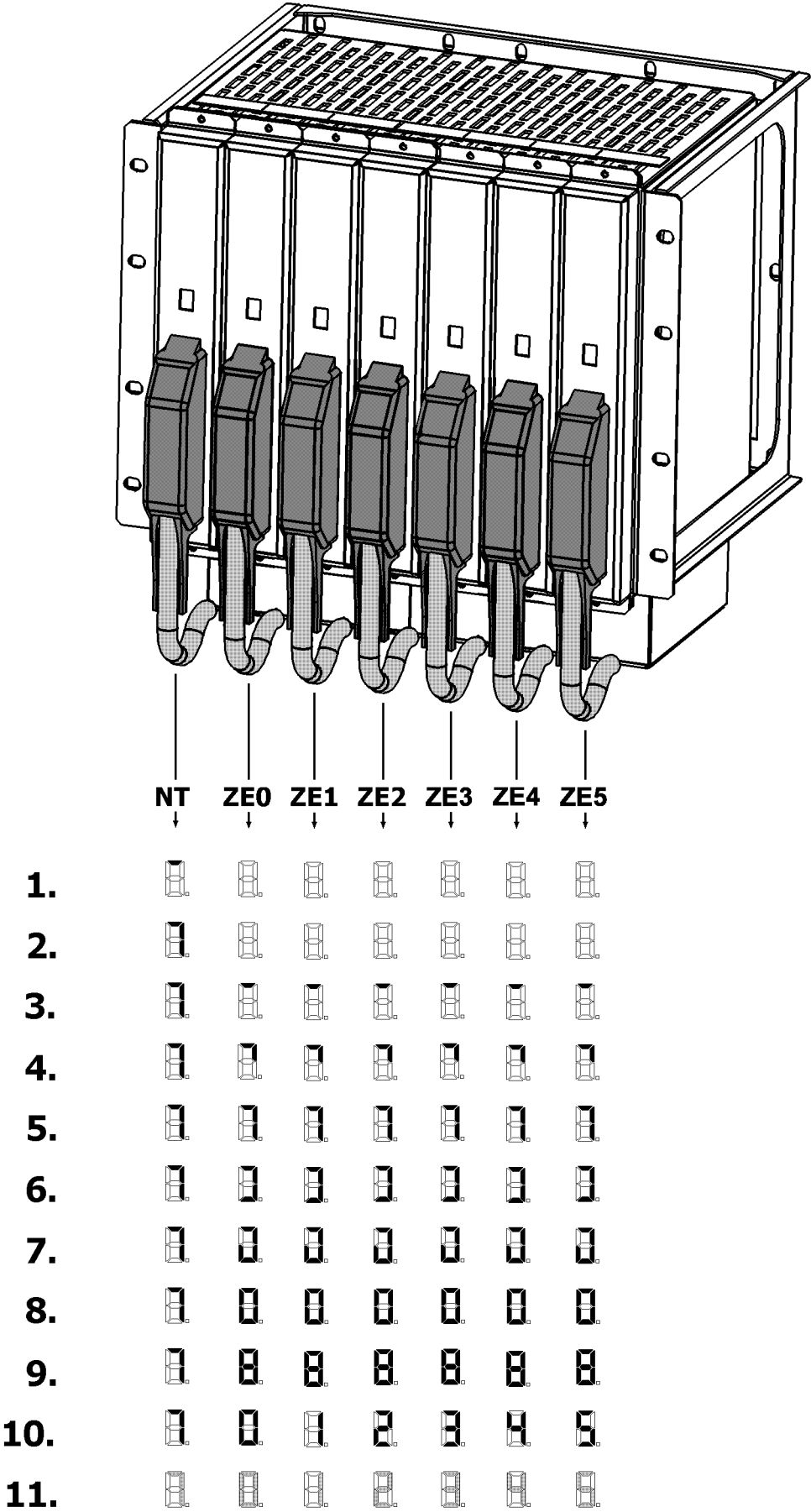
- Replace power unit or CPU0.

System states			
CPU display	Type of display	Error description, possible causes of error for customer service	Possible causes of error
	static	CPU malfunction	hardware defective

Possible error rectification:

- Replace program memory card or CPU.

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### 1.3.4 Locating basic module errors

The following describes how you can locate and rectify unique power unit errors, initialization errors and system errors.

If one of these errors appears when starting or operating the LICCON computer system (display as described in the previous sections), please observe the following:

- A loose or bad contact or fluctuations in the power supply can cause these errors. For this reason, such errors could also appear briefly.
- The error shown on the monitor could be a subsequent error and could also have subsequent errors which are displayed on the CPU displays.
- ▶ Switch off the LICCON computer system and restart it after waiting for at least 5 seconds.
- ▶ Repeat this procedure up to three times (wait 2 minutes after 3 start attempts).

**Result:**

- If a hardware error was the cause, this will probably be identified as an initialization error upon initialization. Initialization errors can only be displayed on the monitor if they are determined on a CPU to which a monitor is connected.
- ▶ If the same error display appears several times:  
Switch off LICCON computer system.
- ▶ Open the control cabinet on the turntable in order to be able to observe the CPU displays.

Two persons are necessary for the following procedure.

- ▶ First person: Restart the crane from the crane cab.
- ▶ Second person: Observe the CPU displays in the control cabinet carefully.

The continuous setpoint state is shown in the picture:

**1st line:** Power unit displays a line, CPU displays are dark:

The control is switched off.

**2nd line:** Power unit displays a “7”, CPUs are dark:

This display appears when the crane is turned on.

**3rd to 9th lines:** Power unit displays a “7”:

When the LICCON computer system is running up, the individual segments of the CPU displays are displayed in sequence to show the results of the successful automatic checks which are being carried out (see illustration). Individual CPUs, particularly those with monitors, could be slightly slower in running up.

**10th line:** After running-up (=after the end of testing for initialization errors) each CPU displays the CPU number in its display.

**11th line:** The CPU changes its display immediately to half strength brightness.

Testing for the presence of system errors begins.

- ▶ Note the power unit display.

---

#### Troubleshooting

Power unit display does **not** correspond with the required display?

There is probably a unique power unit error.

- ▶ See the section “Unique power unit errors”.
- 

---

#### Troubleshooting

Power unit **not** displaying the “7”?

There is probably a power unit error.

- ▶ Check the power supply of the LICCON computer system.
  - ▶ Check the power unit, see description in section “Power unit”.
-

---

**Troubleshooting**

Power unit display displays the "7" and **all** CPU displays remain dark?

There may be an error on a CPU or the program memory card in this group.

- ▶ Check all CPUs, see description in section "Central processing unit".
- 

---

**Troubleshooting**

Power unit display displays the "7" and **one** CPU display remains dark?

There may be an error on this CPU or program memory card. The CPU which deviates first from the required display sequence has determined the error. It is probable that the error is on this CPU.

- ▶ Check all CPUs, see description in section "Central processing unit".
- 

---

**Troubleshooting**

The first flashing CPU to deviate from the setpoint state appears **before** all CPUs display their CPU numbers for the first time (state no. 10).

An **initialization error** has occurred.

- ▶ Refer to the chart "Errors on the central processing unit" in the section "Other system errors" for possible error rectification measures.
- 

---

**Troubleshooting**

The first CPU to deviate from the setpoint state appears **after** all CPUs have displayed their CPU numbers for the first time (state no. 10)?

A **system error** has occurred.

- ▶ Find out whether this is a fatal system error or another system error.
- 

---

**Troubleshooting**

The first CPU display to deviate from the setpoint state is a static "**E**" ?

A **fatal system error** has occurred.

- ▶ Refer to the chart of fatal system errors (FATAL SYSTEM-ERROR) in the section "System errors" for possible error rectification measures.
- 

---

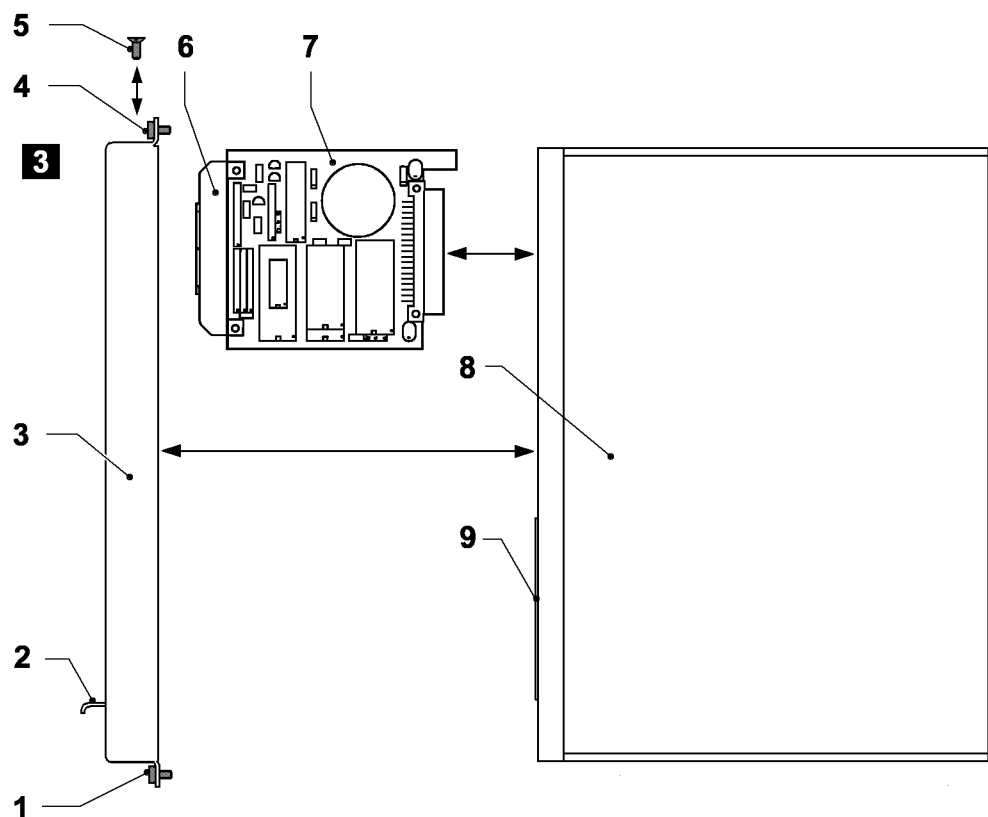
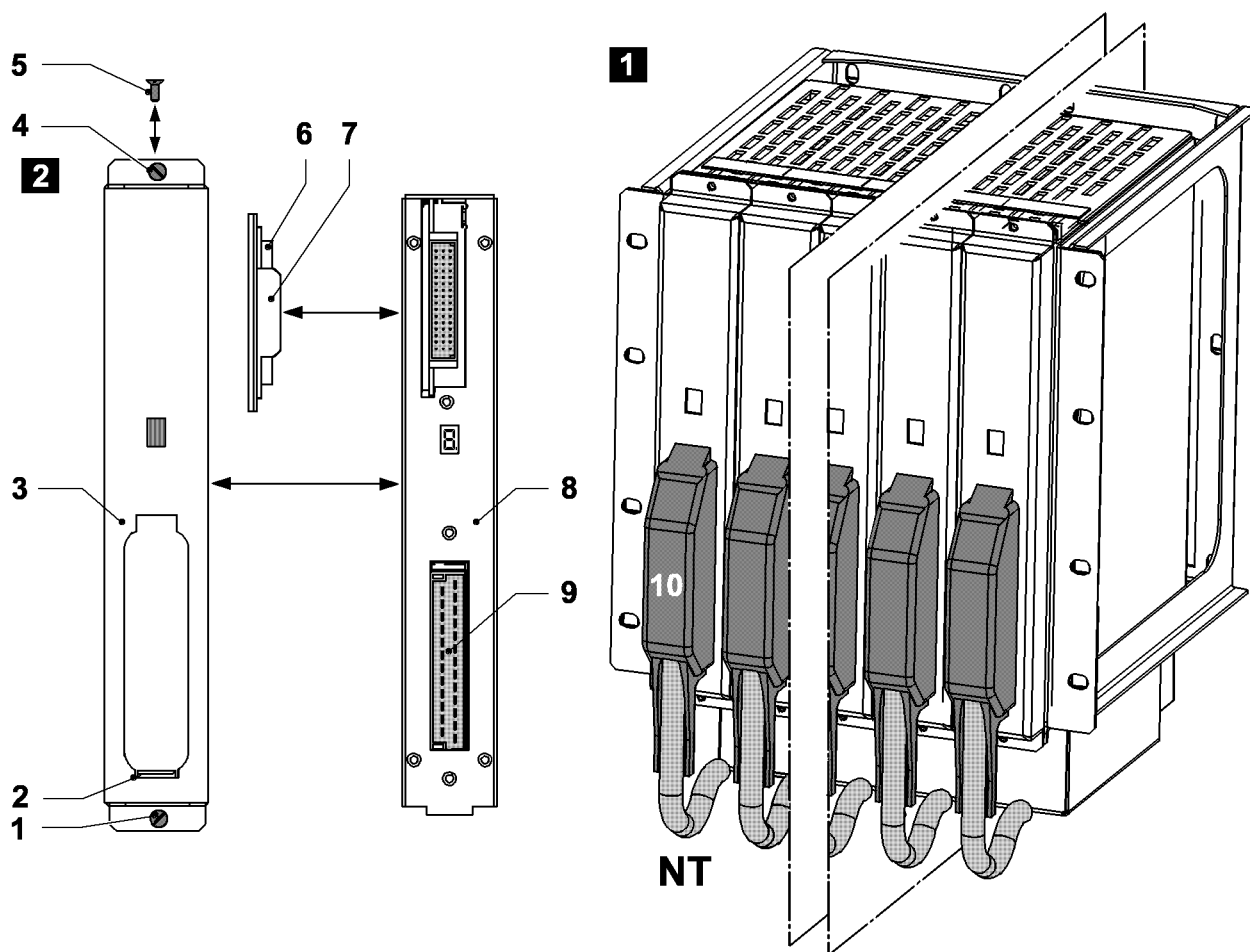
**Troubleshooting**

The first CPU display to deviate from the setpoint state is a static or flashing sign?

An **other system error** has occurred.

- ▶ Refer to the chart of other system errors in the section "System errors" for possible error rectification measures.
-

blank page!



### 1.3.5 Checking the power unit

Illustration 1 shows the power unit (PU) when fitted.

Illustration 2 shows the individual parts of the power unit as seen on the control cabinet.

Illustration 3 shows a side view of the individual parts of the power unit.

During the checking procedure, test whether the power unit **8** and the common memory card **7** inserted in it are properly pushed in. To do this, remove and refit the power unit **8** used and the common memory card **7** once.

Ensure that the crane is turned off.

#### Dismounting the power unit

Ensure that you have a screwdriver to hand.



---

#### Note

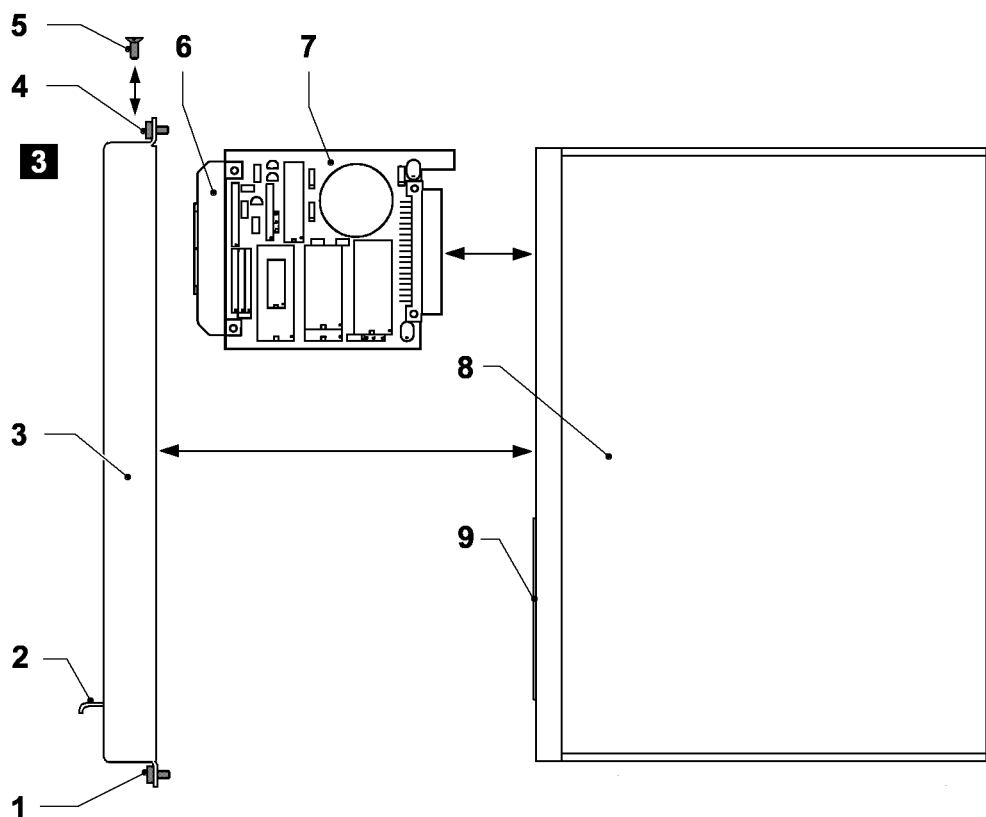
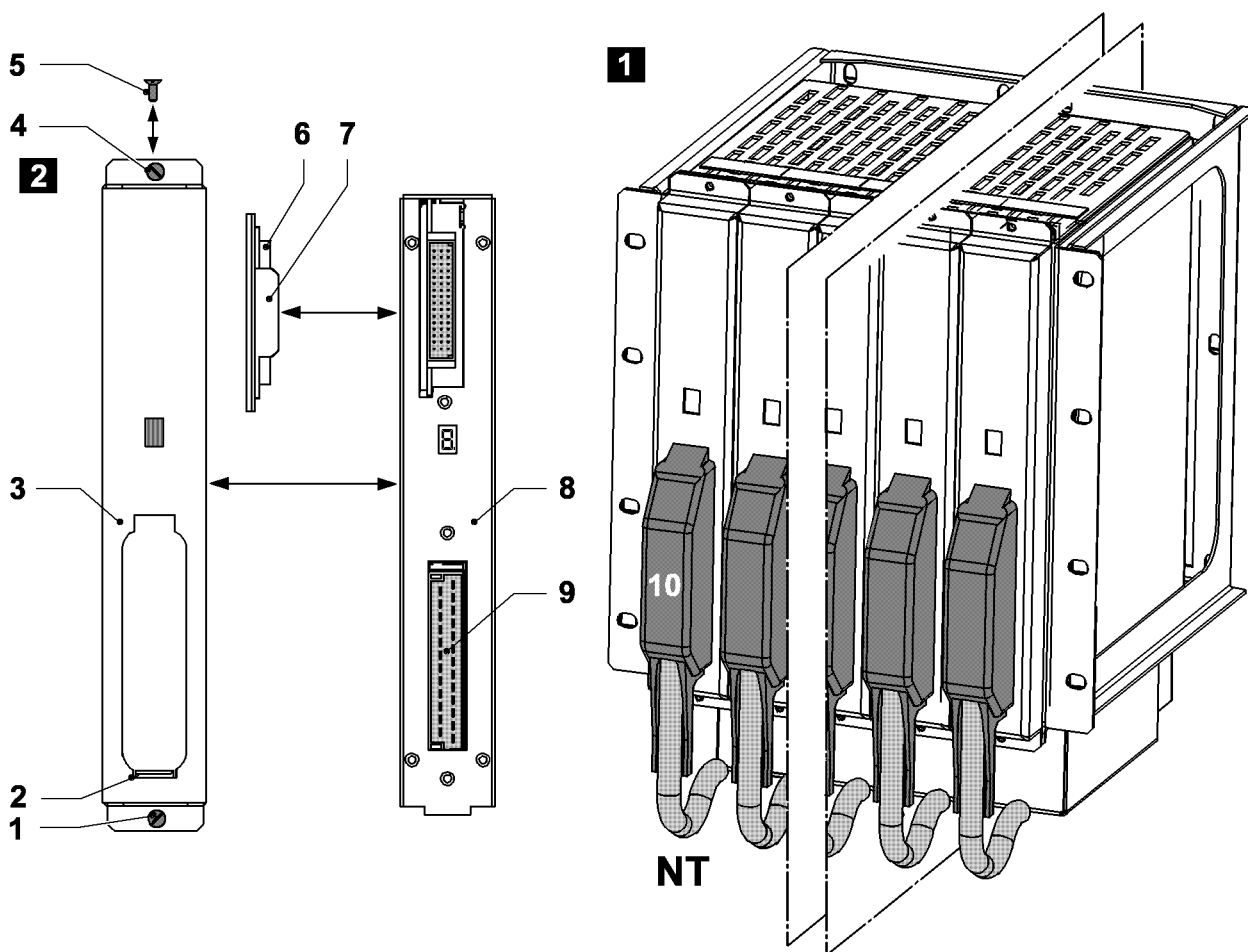
Remove the power unit plug!

When pulling out the power unit plug from the socket, the stand-by power supply of the module will be interrupted.

► This will result in a cold start. The stored set-up state data and the adjusting events will be lost.

---

- Push lightly down and unlock the locking spring **2** on the front cap **3** with a screwdriver. At the same time, pull out the power unit plug **10** and remove it from the socket **9**.
- Unscrew screw **1** and screw **4**. The screws remain screwed to the front cap **3**.
- Pull out the power unit insert firmly.
- Undo screw **5** on the front cap **3** of the power unit. Demount and remove the front cap **3** at the bottom on the power unit **8**.
- Pull the common memory card **7** on the holder **6** out of the power unit **8**.



### Fitting the power unit

---

#### NOTICE

Danger of damage to the plug connections!

When inserting the common memory card **7** into the power unit, the plug connections could be damaged.

- ▶ Press the common memory card **7** lightly on at first, then insert firmly to the limit position.
- ▶ Hold the common memory card **7** on the holder **6** and push it into the power unit **8**.
- ▶ Attach the front cap **3** at the bottom on the power unit **8**. Tighten the screw **5** on the top on the front cap **3** of the power unit and mount the front cap **3**.

---

#### NOTICE

Danger of damage to the plug connections!

When inserting the power unit **8** the plug connections could be damaged.

- ▶ Press the power unit **8** lightly on at first, then insert firmly to the limit position.

- 
- ▶ Push the power unit insert into the basic module carrier.
  - ▶ Screw in screw **1** and screw **4** on the front cap **3**.

---

#### NOTICE

Danger of property damage!

The locking spring **2** must engage so that it can execute its function properly.

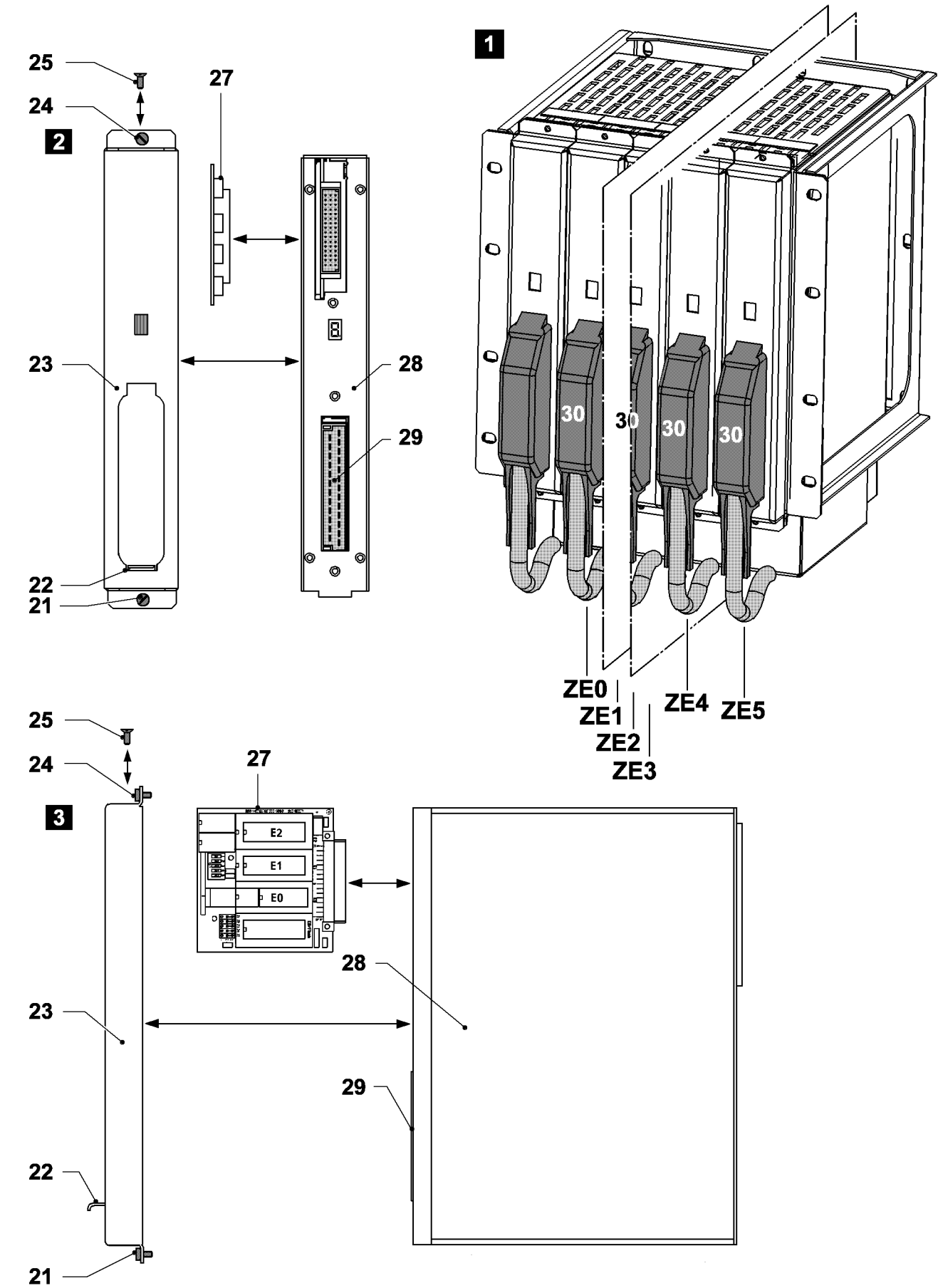
- ▶ When inserting the power unit plug **10** into the socket **9**, allow the locking spring **2** to engage.
- ▶ Insert the power unit plug **10** in the socket **9**.
- ▶ Start the crane.
- ▶ Check whether the error occurs once more.

---

#### Troubleshooting

Error occurs again?

- ▶ Replace the power unit **8** used with a replacement power unit.
-





### 1.3.6 Checking the central processing unit

Illustration 1 shows the central processing unit when fitted.

Illustration 2 shows the individual parts of the central processing unit as seen on the control cabinet.

Illustration 3 shows a side view of the individual parts of the central processing unit.

During the checking procedure, test whether the central processing unit **28** and the program memory card **27** inserted in it are properly pushed in. To do this, remove and refit the central processing unit **28** used and the program memory card **27** once.

Ensure that the crane is turned off.

#### Dismounting the central processing unit

Ensure that you have a screwdriver to hand.



#### Note

Pull out the central processing unit!

- ▶ When pulling out the central processing unit from the module carrier, the stand-by power supply of the CPU will be interrupted. This results in a cold start on this central processing unit. The set-up state data and the adjusting events stored on this CPU are lost. The values must be subsequently reset.

- ▶ Push lightly down and unlock the locking spring **22** on the front cap **23** with a screwdriver. At the same time, pull out the output plug **30** and remove it from the socket **29**.
- ▶ Unscrew screw **21** and screw **24**. The screws remain screwed to the front cap **23**.
- ▶ Pull out the central processing unit insert firmly.
- ▶ Undo screw **25** on the front cap **23** of the power unit. Demount and remove the front cap **23** at the bottom on the central processing unit **28**.
- ▶ Pull the program memory card **27** out of the central processing unit **28**.

#### Fitting the central processing unit

#### NOTICE

Danger of damage to the plug connections!

When inserting the program memory card **27** into the central processing unit, the plug connections could be damaged.

- ▶ Press the program memory card **27** lightly on at first, then insert firmly to the limit position.

- ▶ Push the program memory card **27** into the central processing unit **28**.
- ▶ Attach the front cap **23** at the bottom on the central processing unit **28**. Tighten the screw **25** on the top on the front cap **23** of the central processing unit and mount the front cap **23**.

#### NOTICE

Danger of damage to the plug connections!

When inserting the central processing unit the plug connections could be damaged.

- ▶ Press the central processing unit lightly on at first, then insert firmly to the limit position.

- ▶ Push the central processing unit insert into the basic module carrier.
- ▶ Screw in screw **21** and screw **24** on the front cap **23**.

#### NOTICE

Danger of property damage!

The locking spring **22** must engage so that it can execute its function properly.

- ▶ When inserting the output plug **30** into the socket **29**, allow the locking spring **22** to engage.
- ▶ Insert the output plug **30** in the socket **29**.
- ▶ Start the crane.
- ▶ Check whether the error occurs once more.

---

### Troubleshooting

Error occurs again?

- Replace the central processing unit used with a replacement central processing unit.
- 

## 1.4 Application errors

Application errors are errors which can occur during crane operation due to incomplete construction of the crane, incorrect operation or due to external influences.

The application errors shown on the monitor are subdivided into:

- 1.) Application errors **without** LICCON-Error-Code
- 2.) Application errors **with** LICCON-Error-Code

Errors which occur due to crane operation are subdivided into:

- 1.) Errors which **lead to** shut-down. Shut-down is always displayed by the shut-down symbol.
- 2.) Errors which **do not lead to** shut-down. The crane operator will be warned about this.

### 1.4.1 Application errors without LICCON-Error-Code

External influences which lead to an application error without LICCON-Error-Code are:

- removal of central processing unit from the basic module
- removal of power unit from the basic module
- interruption of the power supply to the LICCON computer system

This leads to a data loss in the battery-buffered data memory of the central processing unit(s).

When this occurs, the system will execute a **cold start**, i.e. a restart of the LICCON computer system.

The cold start can already be identified in the configuration screen.

Consequences and identification characteristics of a cold start:

- The original configuration state is lost. The 1st configuration state will be reset in the configuration screen.
- The reeving "0" is set with the displayed configuration state.
- The incremental counters of the affected central processing units will be set to "0". This means that the absolute winch path measurement and the current winding radius are lost.
- The winches are deactivated, which is displayed in the winch status display by two double slashes (see chapter 4.02).



#### Note

Winch display!

- The winch display is running, but is incorrect.
- 

Measures after a cold start data loss:

- Ensure the power supply to all power units and central processing units.
- Reset lost parameters in the programs "Configuration" and "Control parameters".
- Realign the winches. Move the alignment position.



#### Note

Alignment position!

- The alignment position can lie in different positions of the winches (dependent on crane type).
-

LEC	Error description	Possible cause of error
without LEC	overload - STOP-symbol element flashing	The permitted "maximum load according to the load chart and reeving" for the relevant configuration and operating state has been exceeded.

Remedying the overload status depends on how the overload occurred and a decision should be made by the crane operator according to the individual situation.

It should be ensured that by bypassing the overload protection only the crane movement that is opposed to the crane movement which caused the overload shut-down is made.

Measures in this respect include:



### DANGER

Crane can topple over!

By setting down the load, the crane can in certain cases (for example with: derrick ballast raised; **F1** less than/equal to **F1min**) tip over. There is a risk of FATAL INJURY.

- ▶ You should only set down the load after testing the load torque carefully and after executing load torque minimizing measures (for example: lowering the derrick ballast).

- ▶ Set down the load with hoist gear.

or



### DANGER

Risk of accident!

- ▶ The "Bypass Overload Protection" switch on the left armrest can enable luffing up with a suspended load, thereby diminishing the load torque.

- Please take the utmost care when working in this situation.
- ▶ Work with diminished load torque.

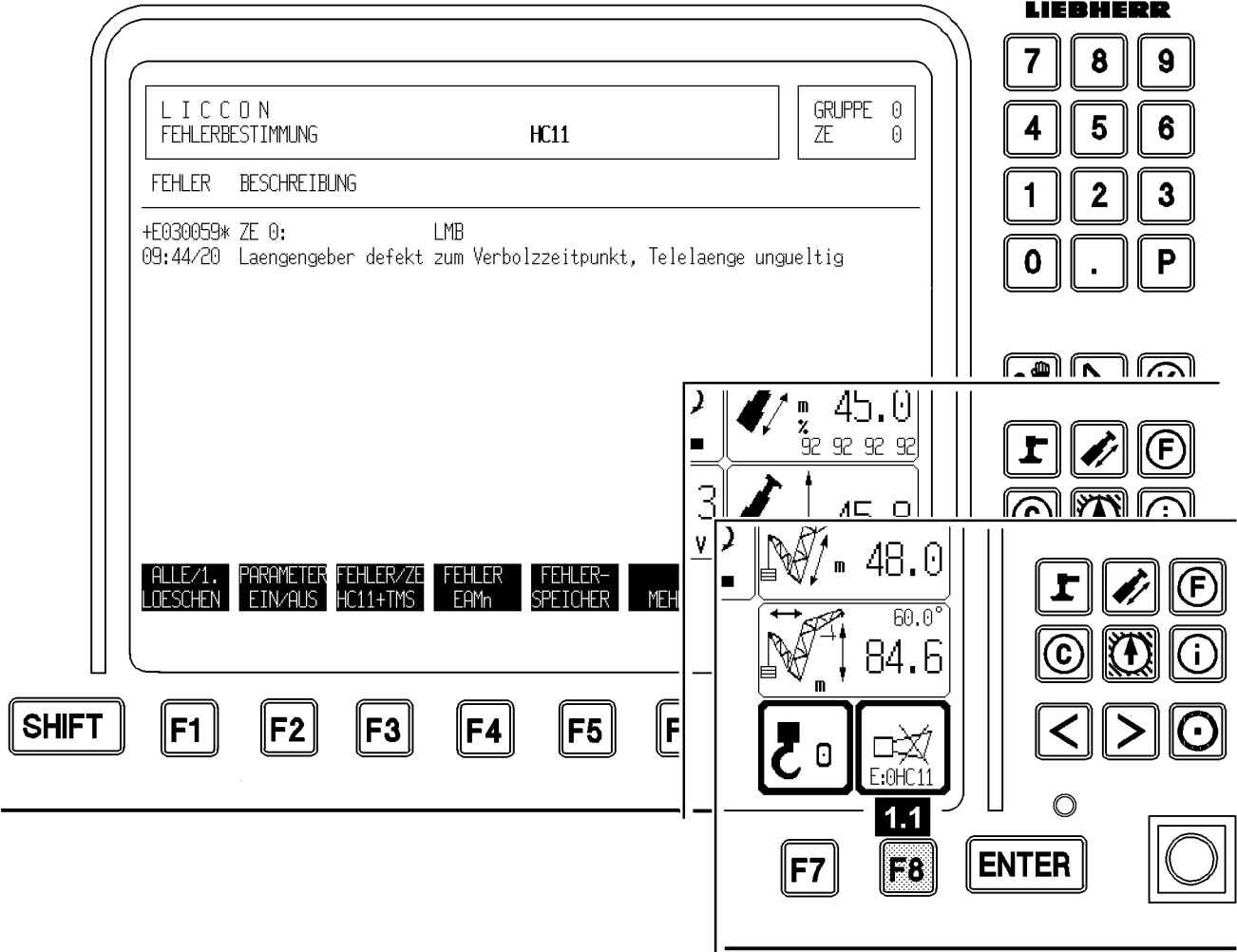
LEC	Error description	Possible cause of error
without LEC	wind sensor symbol element flashing	The maximum permitted wind speed has been exceeded.



### DANGER

Risk of accident!

- ▶ If necessary, strip down the crane or stop crane operation.
- ▶ If possible:  
Set up and adjust operating mode and configuration state with a more suitable load chart.
- ▶ If this is not possible, stop crane operation.



### 1.4.2 Application errors with LICCON-Error-Code

**Note**

LICCON error determination!

► See also the section "LICCON error determination".

The functions of the following sensors are monitored:

- Hoist limit switches
- Angle sensors
- Pressure sensors
- Length sensors

The limits of the sensors are monitored for the following limit errors:

- Open circuit
- Short circuit to earth
- Short circuit to +24 V (supply voltage)

A distinction is made between the following application error types:

- Errors due to a technical defect
- Errors due to crane operation
- Errors due to external influences

**Note**

LMB errors!

Generally, the higher the LICCON-Error-Code in the case of **LMB errors** (4th, 5th and 6th position), the higher the danger from the error.

- 0<LEC<64: No LMB shut-down, actual value calculation
- from 64: An LMB shut-down takes place (=shut-down of load torque increasing movements)

Application errors will be displayed dynamically in the programs "Operation", "Telescoping", and "Supporting" by means of an error message. An acoustic signal also sounds.

► Press function key **F8** once.

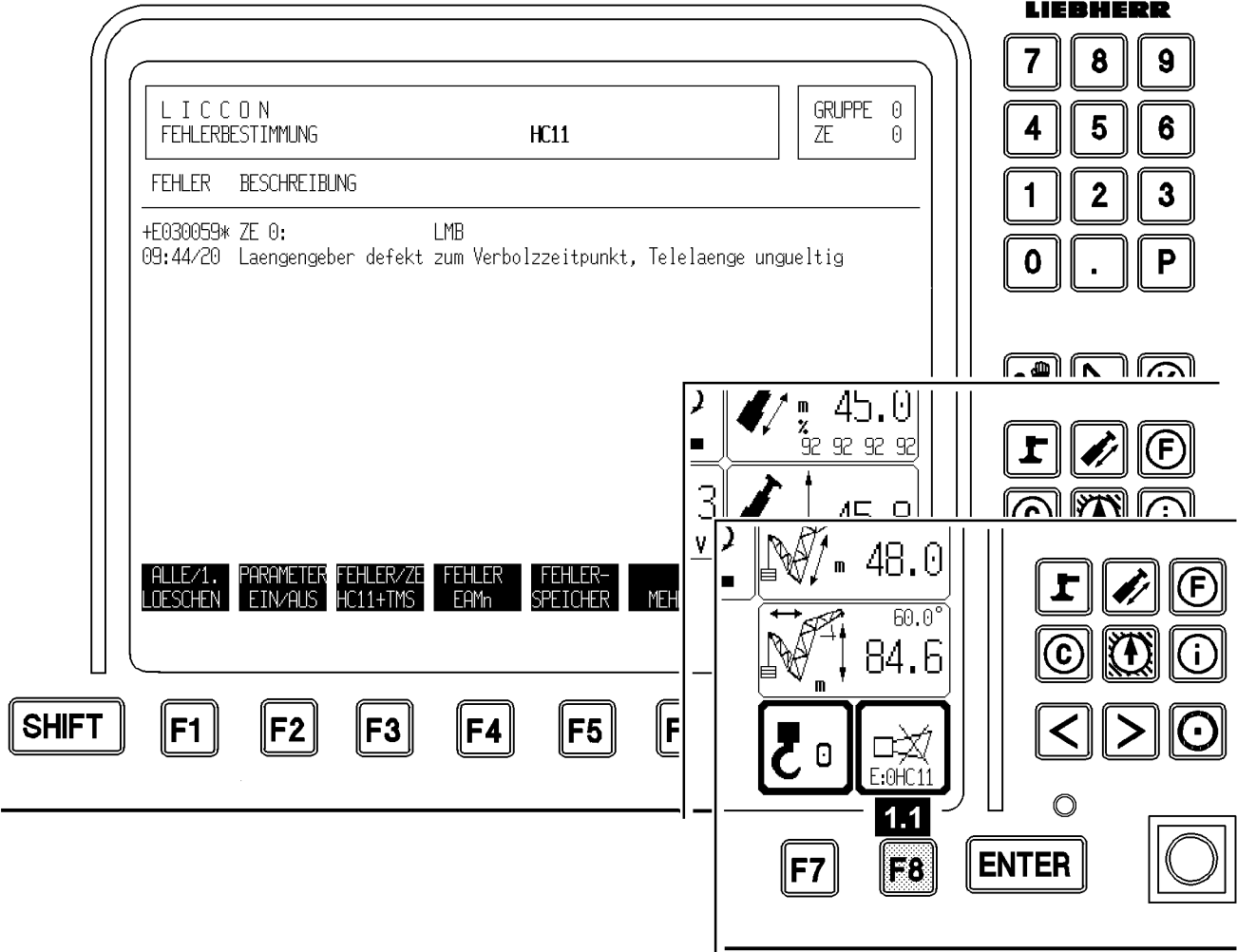
**Result:**

- Acoustic signal is switched off.

► Press function key **F8** twice.

**Result:**

- Change to error determination image, program "Test system". The application error will be documented in the LICCON-Error-Code (LEC).



LEC	Error description	Possible cause of error
with LEC	hoist limit switch has been activated - hoist limit switch symbol element flashing	The hook block has raised the hoist limit switch weight and thereby activated the hoist limit switch.

Possible error rectification:

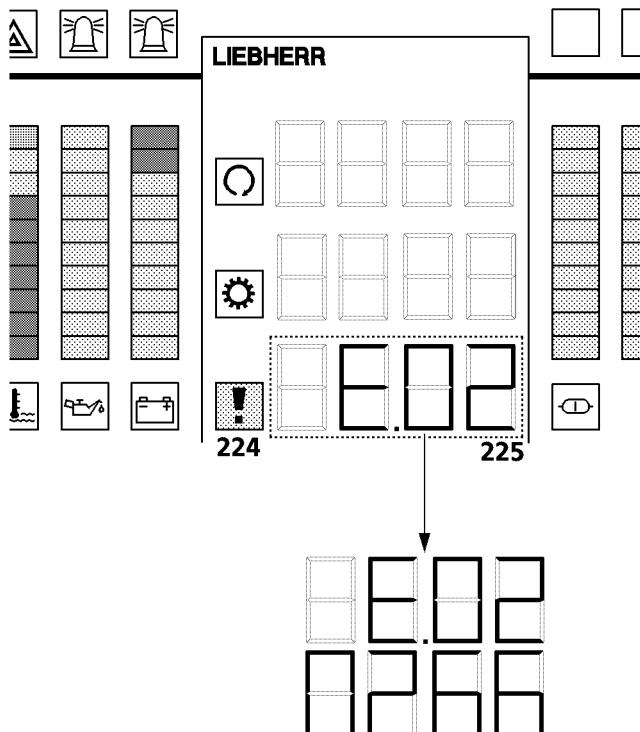
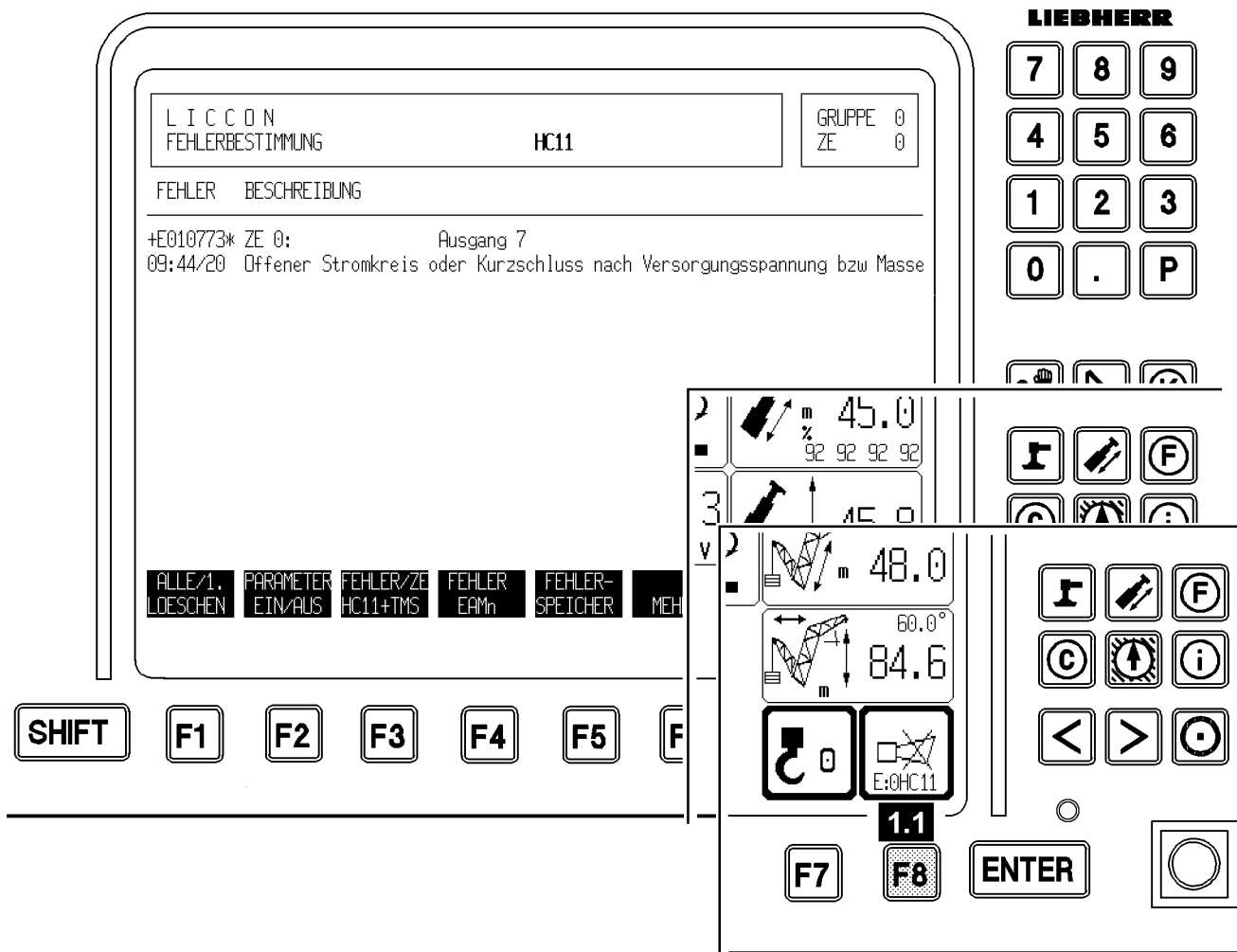


---

**DANGER**

Risk of accident!

- ▶ Observe the hook block very carefully.
  - ▶ Ensure that the hook block does not move further upwards.
- 
- ▶ Press "lower hoist gear" on the affected winch until the hook block no longer touches the hoist limit switch weight.





## 1.5 System errors

You can find further information on this subject in the section "LICCON error determination".



### Note

Switch off the ignition!

- ▶ Switching off the ignition deletes **all** errors (active and inactive) in the local error vaults.

### 1.5.1 Superstructure

#### Active system errors

Only active engine and transmission errors will be treated and displayed as system errors.

System errors will be dynamically displayed in the program "Operation", "Telescoping", "Support" with an error message in the symbol element "Horn".

Example of an active system error, OW ( illustration 1): **E:OHC11**

An acoustic signal also sounds.

- ▶ Press function key **F8** once.

#### Result:

- Acoustic signal is switched off.

- ▶ Press function key **F8** twice.

#### Result:

- Change to error determination image, program "Test system". The system error will be documented in the LICCON-Error-Code (LEC). Example: active system error superstructure OW +E010773

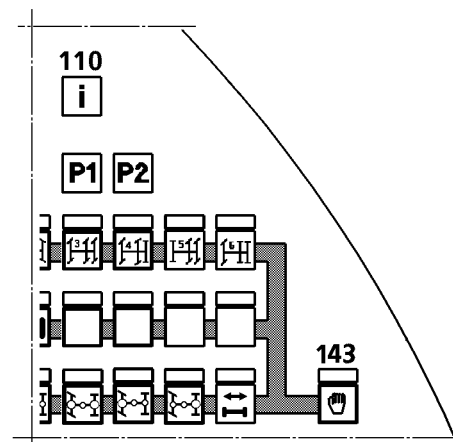
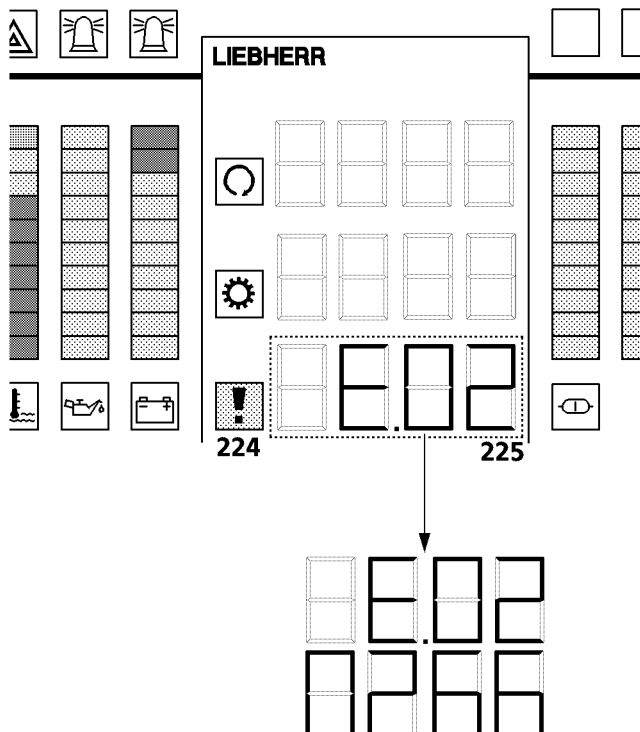
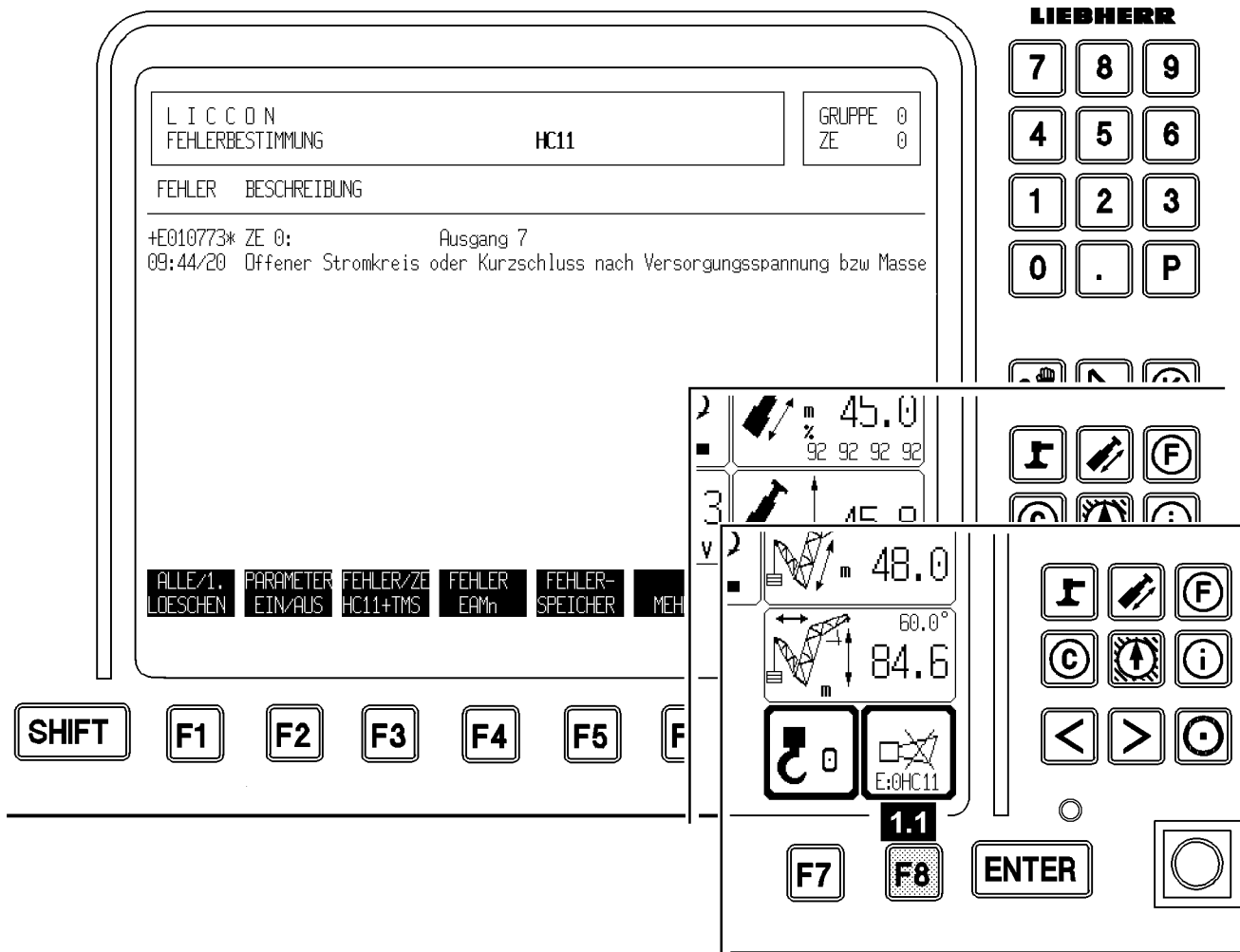
#### Inactive system errors

Inactive errors can be displayed using function key **F2** in subprogram "PARAMETER ON".

Identification in this case is "-".

Example of an inactive system error, OW: - **E010773**

- ▶ If inactive errors are to be displayed:  
Press function key **F2**.



## 1.5.2 Chassis



### Note

► This section applies to LTM and LG cranes only.

### Active system errors

Only active engine and transmission errors will be treated and displayed as system errors.

If there is a system error, the warning light **224** on the display unit flashes. Via the **i**-key **110** on the keypad unit, the LICCON-Error-Code (LEC) on the display unit **225** will be alternately displayed for the duration of the operation. This means that the entire LEC will be alternately displayed.

Example of an active system error, CH: **E.02 0266**

- If several active errors are present at the same time:  
Press the **i**-key **110** again.

### Result:

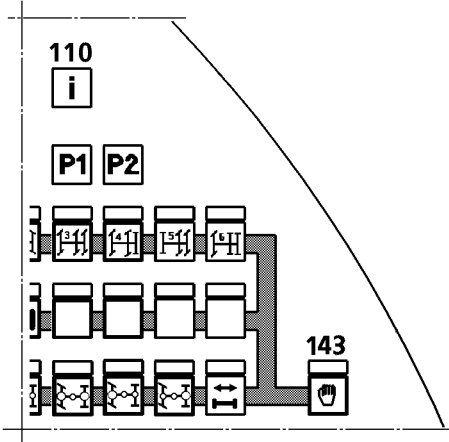
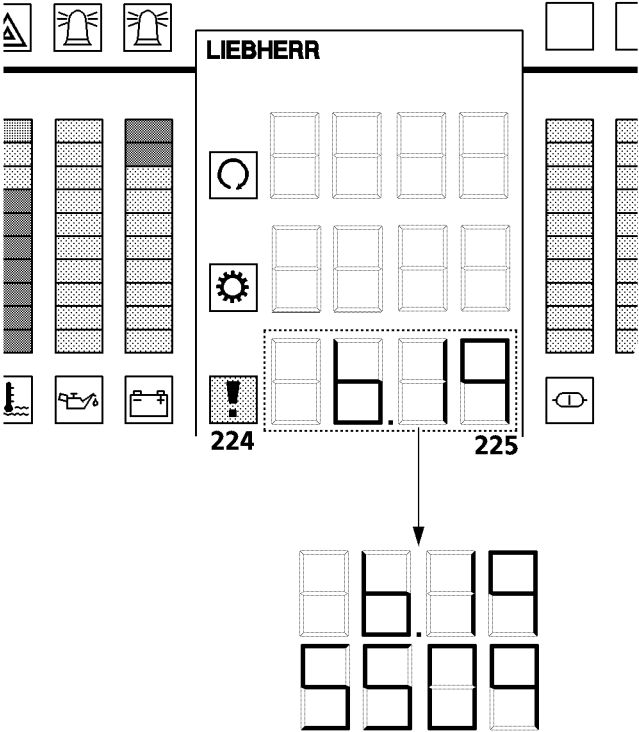
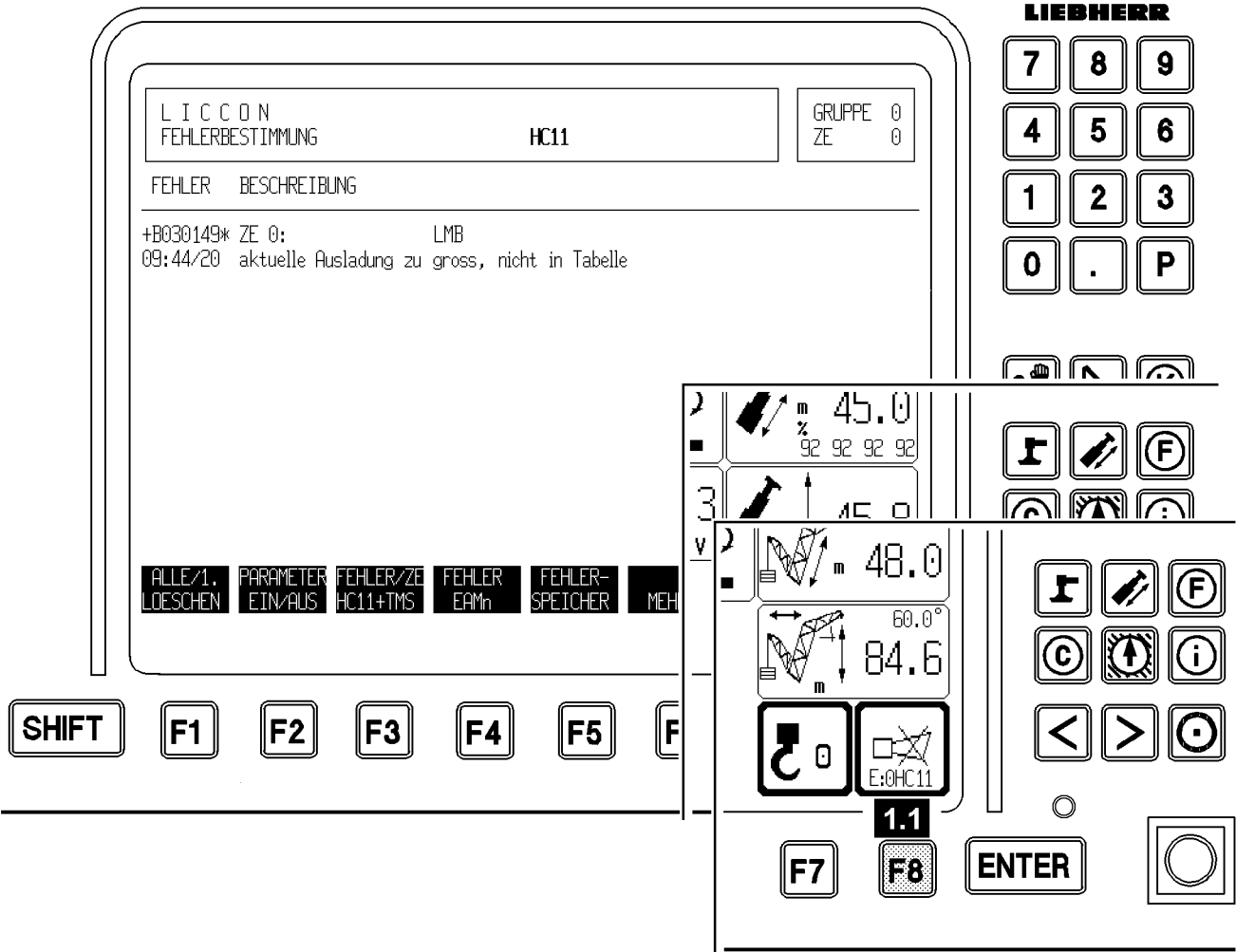
- All existing active errors will be displayed.
- Once all existing errors have been displayed “End.” appears on the display unit **225**. By pressing the **i**-key **110** again, the first error will be displayed once more.

### Inactive system errors

Inactive errors can be displayed by pressing the Hand button **143** and the **i**-button **110** on the display unit **225** at the same time. Identification in this case is “-”.

Example of an inactive system error, CH: **-E.02 0266**

- If inactive errors are to be displayed:  
Press the Hand button **143** and the **i**-button **110** simultaneously.



## 1.6 Operating errors

You can find further information on this subject in the section "LICCON error determination".

### 1.6.1 Superstructure

#### Operating errors in the program "Operation", "Telescoping", "Support"

Operating errors will be dynamically displayed in the program "Operation", "Telescoping", "Support" with an error message in the symbol element "Horn".

An acoustic signal also sounds.

► Press function key **F8** once.

**Result:**

– Acoustic signal is switched off.

► Press function key **F8** twice.

**Result:**

- Change to error determination image, program "Test system".
- The operating error will be documented in the LICCON-Error-Code (LEC).
- The operating error is always displayed at the very top in the error vault.
- If there are several operating errors present on different CPUs and I/O modules: The operating error with the lowest CPU or I/O module number will be displayed.
- Slewing gear operating error: CPU0
- Telescoping operating error: CPU1
- Winch 1/2 / luffing operating error: CPU2
- To find out why a crane function is not functioning: In the case of several existing operating errors, go, in the error determination screen, to the CPU on which the actual crane function is performed.

#### Operating errors in the program "Configuration"

In the configuration screen, only the operating errors originating in the program "Configuration" will be displayed for approx. 5 seconds.

► Within these 5 seconds, press the function key **F8** once.

**Result:**

- Change to error determination image, program "Test system".
- Error visible in error determination display.

► After the 5 seconds, press the function key **F8** once.

**Result:**

- Change to error determination image, program "Test system".
- Error **not** visible in error determination display.

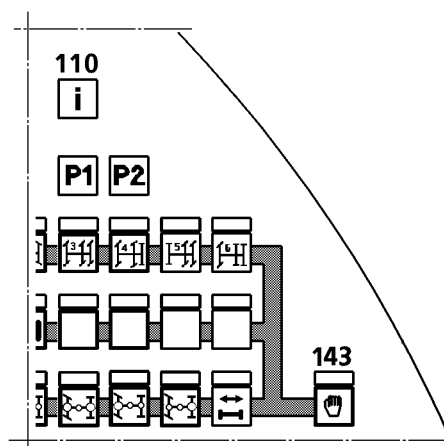
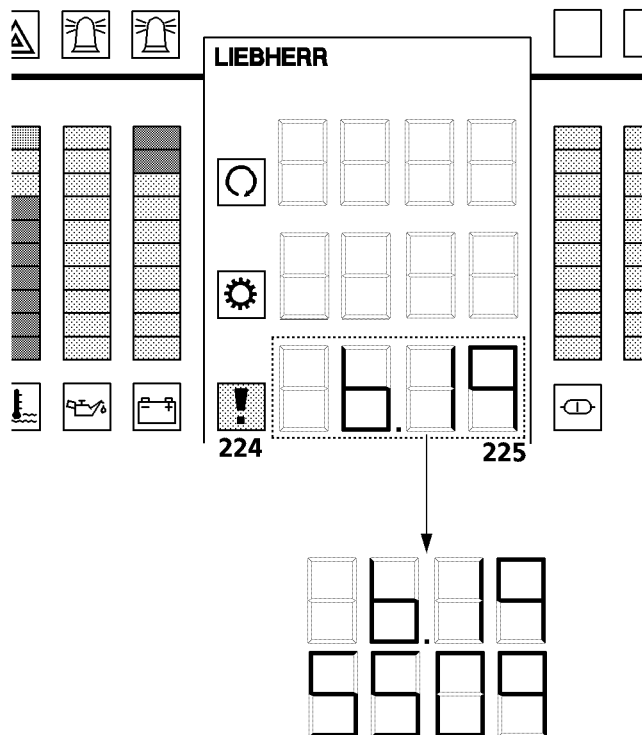
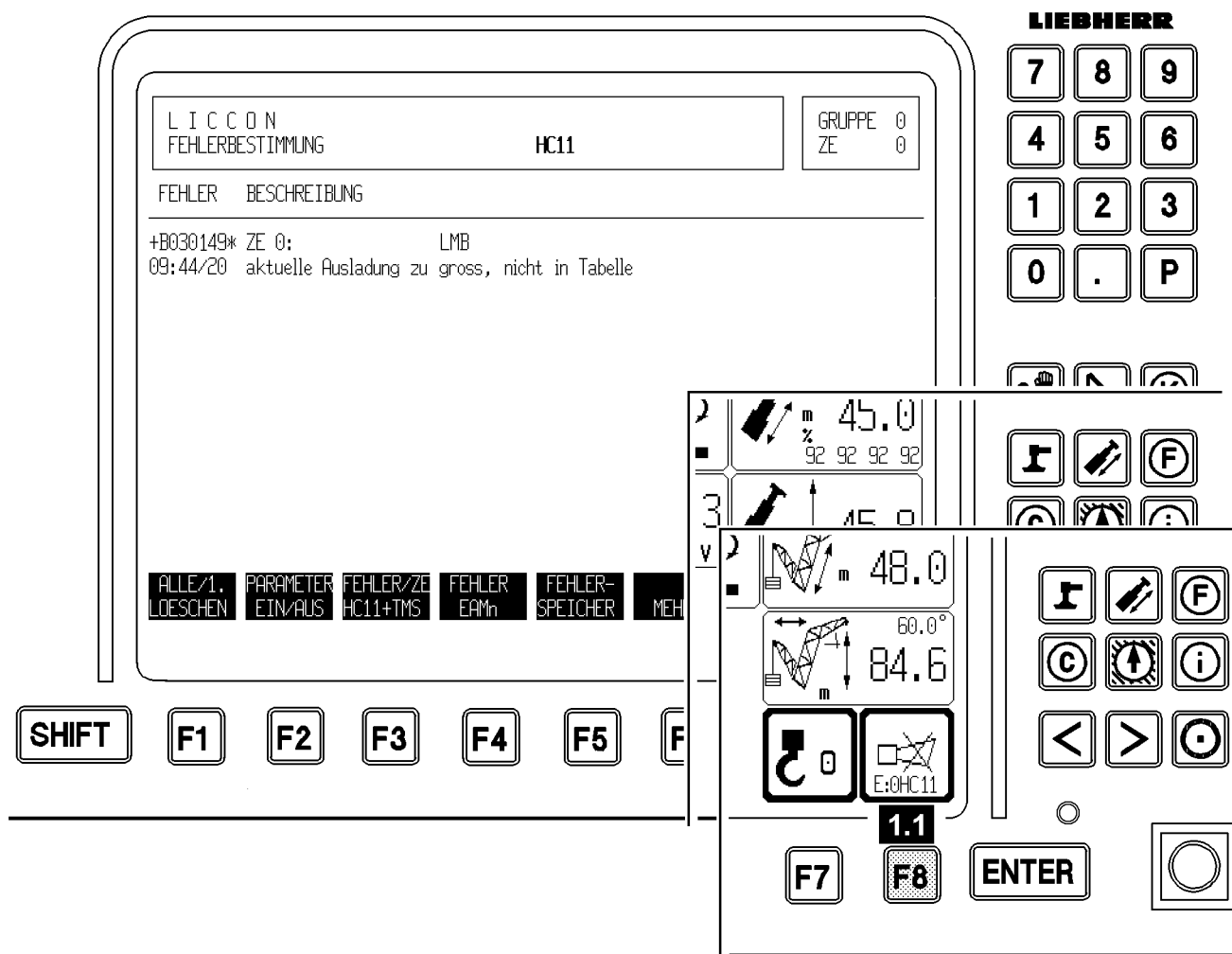
► Press function key **F8** twice.

or

■ Press program key **Configuration**.

**Result:**

- Change to back to program "Configuration".



## 1.6.2 Chassis



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### Note

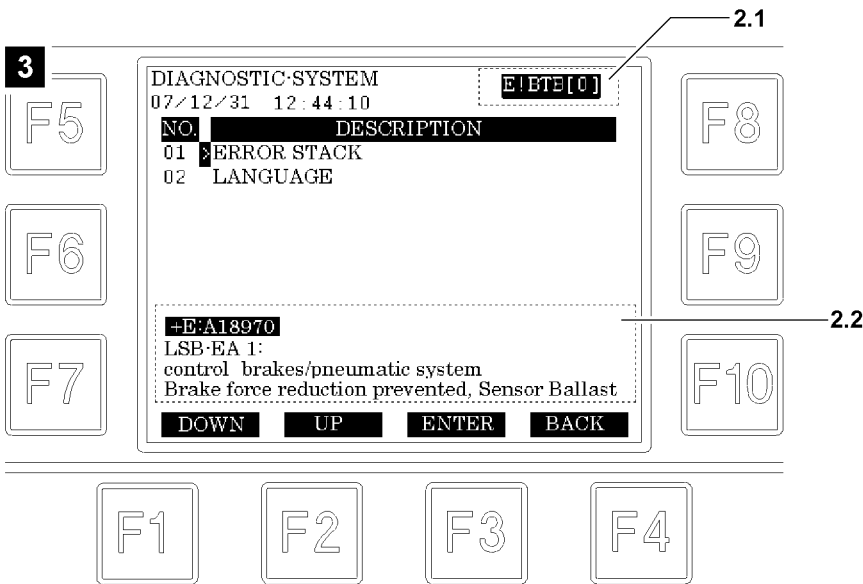
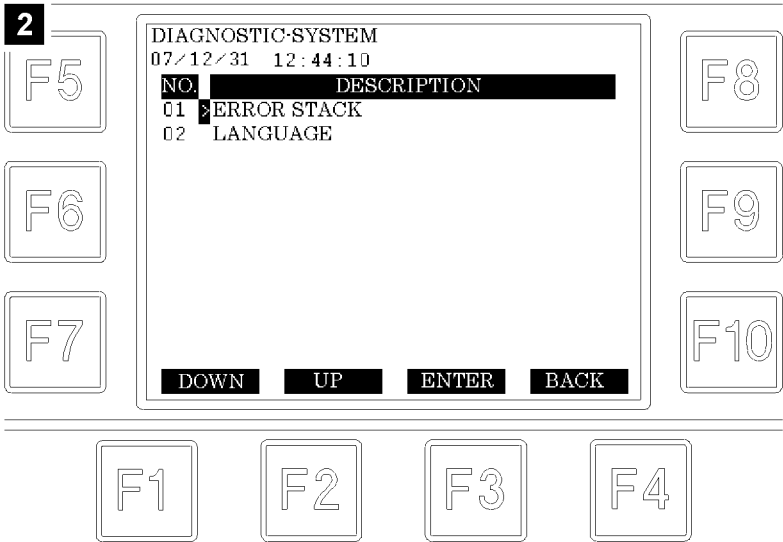
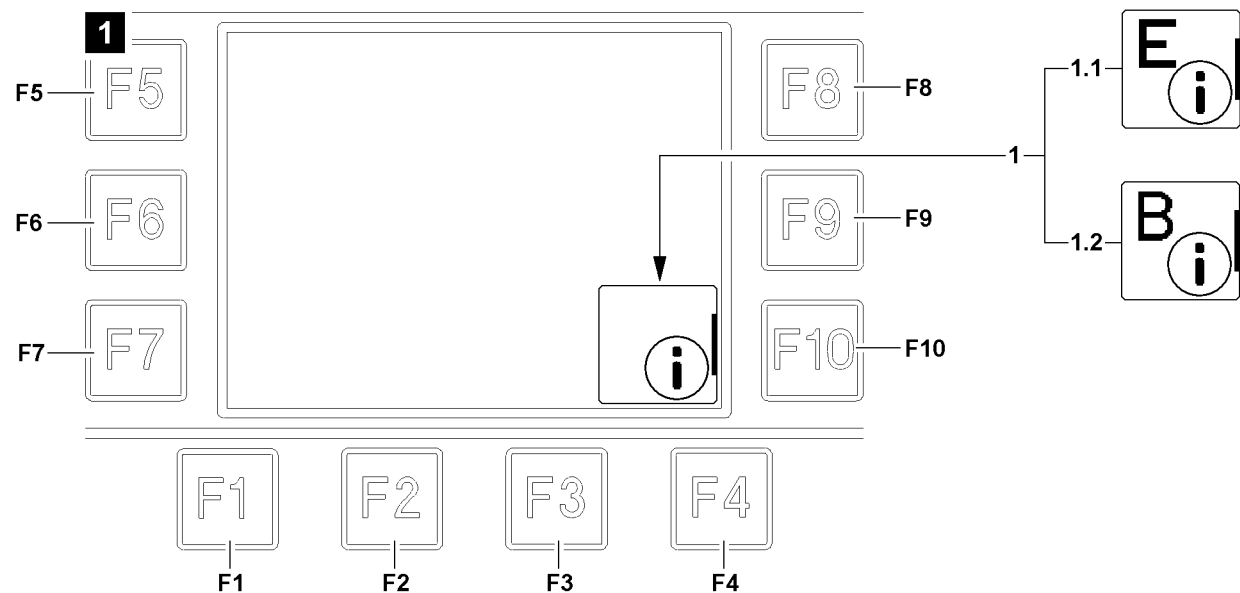
► This section applies to LTM and LG cranes only.

---

If an operating error is caused: The warning light **224** on the display unit **225** illuminates. The operating error "B" will be alternately displayed in the LICCON-Error-Code (LEC) on the display unit **225** (see section "ICCON-Error-Code").

Example: **b.19 5509**

If an operating error is caused while a system error is pending: The warning light **224** on the display unit **225** illuminates. The operating error "B" appears automatically in the LICCON-Error-Code (LEC) on the display unit **225**.





# 1 The BTT test system



## Note

- Applies only for cranes with Bluetooth™ Terminal (BTT).

Malfunctions in the LICCON computer system generate error messages. The created error messages can be evaluated on the BTT test system.

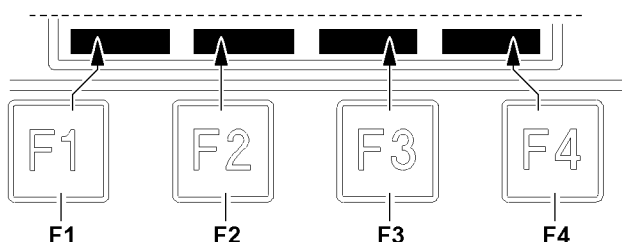


## Note

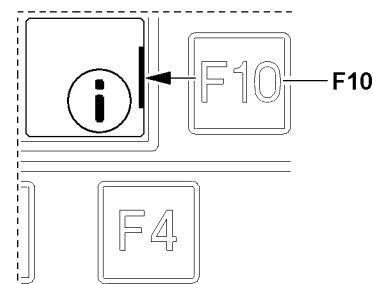
Examples of error messages and error text.

- The error texts in this chapter are examples and may not match reality exactly.
- The error texts in the illustrations are in English. Menu tour in English is selectable on the BTT, see section "Settings on the BTT test system".

## 1.1 Function keys in the BTT test system



B113495



*B113495: Assignment principle of function keys*

<b>F1</b> Function key	• Menu dependent
<b>F2</b> Function key	• Menu dependent
<b>F3</b> Function key	• Menu dependent
<b>F4</b> Function key	• Menu dependent
<b>F5-F9</b> Function key	• Not assigned
<b>F10</b> Function key	• Start the BTT test system

## 1.2 Starting the BTT test system

When the icon 1 appears, the start screen of the BTT test system can be called up by pressing the function key **F10**, see illustration 1.

- Press the function key **F10**.

### Result:

- The start screen of the BTT test system is shown, see illustration 2.
- Selection can be made among the displayed program points, see the following sections.



## Note

Occurring error message

- If an error message ( system error 1.1 / operating error 1.2) occurs, then the error is shown in the start screen of the BTT test system, see illustration 3. The display is shown in the display area 2.1 or display area 2.2.

## 2 Function determination in the BTT test system

Malfunctions in the LICCON computer system generate error messages. The created error messages can be evaluated on the BTT test system.



### Note

Sporadically occurring errors

If errors occur sporadically, it can be helpful for diagnostics not to change anything on the crane.

Sporadically occurring errors are not automatically deleted as long as the LICCON computer system is running.

- If possible, do not shut the LICCON computer system down or operate it in stand-by mode until the diagnostics is completed.

### 2.1 Decoding of LICCON-Error-Code (LEC)

The error code is displayed on the BTT display (error determination display in the BTT test system). The LICCON Error Code (abbreviated as error code) describes two possible error classes:

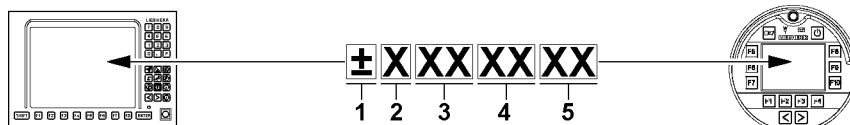
- System errors “**E**”:  
are triggered by internal errors in the LICCON computer system.
- Operating errors “**B**”:  
are triggered by incorrect operation of the crane.

Errors can be active as well as inactive:

- **Active errors**  
Errors which are present continuously (Example: cable break, sensor defective, ...).  
Marked with a “+”
- **Inactive errors**  
Errors which only occur momentarily (Example: loose contact).  
Marked with a “-”

The configuration of the LICCON error code is based on a error class description with subsequent 6-digit error number.

Every LICCON error code can be decoded in five fields:



B113488

Field	Description content
1	“+” : active error / “-” : inactive error
2	Error class: “ <b>B</b> ” = system error / “ <b>E</b> ” = system error
3	Device (module which generated / reported the error)
4	Error path (source of error)
5	Type of error



### Note

LICCON Error Code Manual (LICCON Error code list)

- All error numbers / LEC are listed in the “LICCON Error Code Manual” (LICCON error code list).

## 2.2 Functionality of the BTT error stack

All errors are displayed together with their error number and stored and documented in the error stack.

- If the error stack is filled with active system errors, a system error will be overwritten if an operating error occurs.
- If an error is active and the cause of the error is not remedied, then a new active error message is created and shown when the error is deleted. The error message appears with new time stamp (date and time).
- If an error is inactive and the cause of the error is not remedied, then no new error message is created after the error is deleted. When the error occurs again, a new error message is created and shown. The error message appears with new time stamp (date and time).



### Note

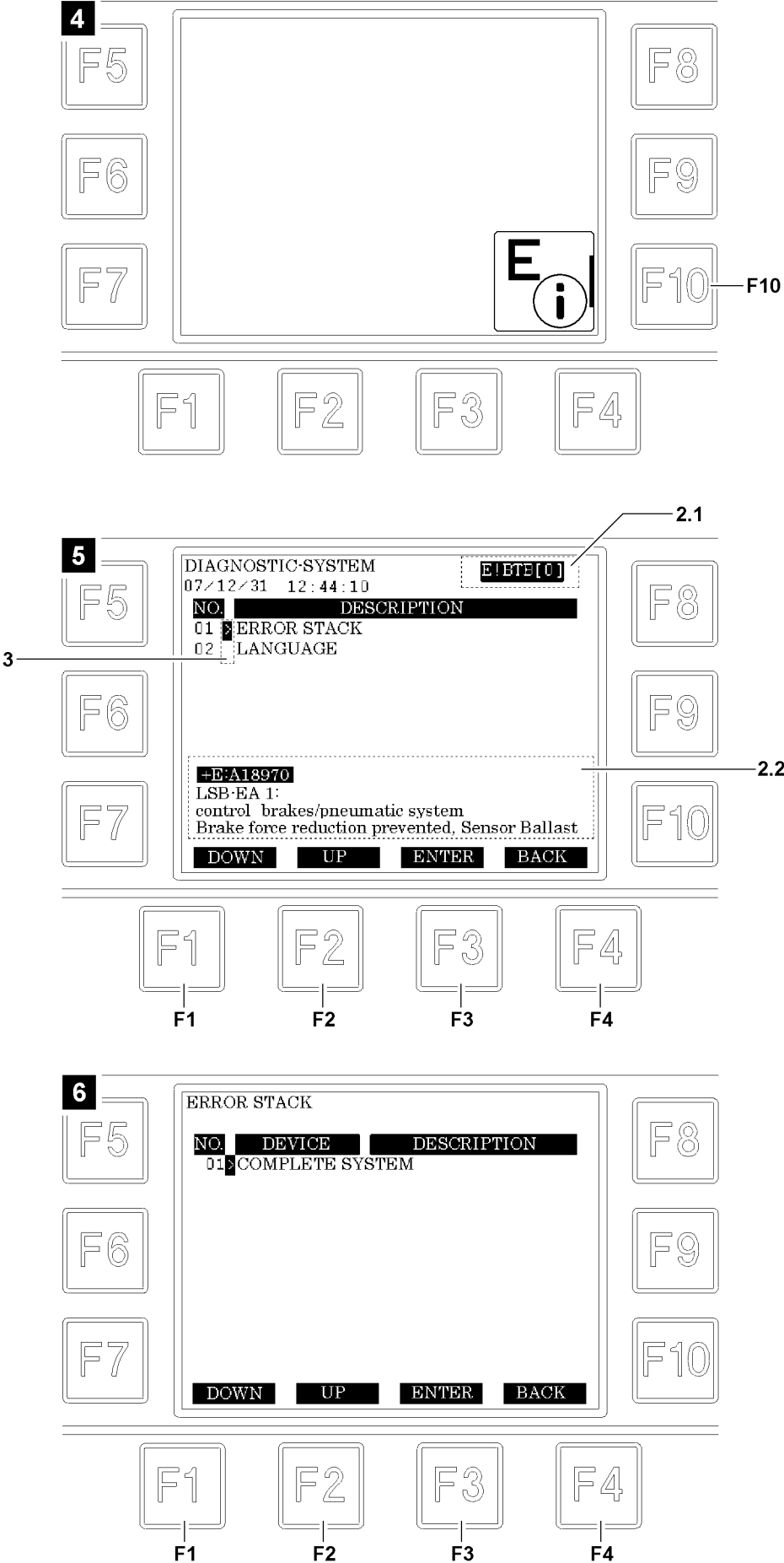
Applies only for cranes with ignition in crane chassis!

By turning the ignition in the crane chassis off, the error stack of the BTT test system is deleted for the most part.

Active errors are recognized again then the LICCON computer system is booted up.

Inactive errors are only recognized again when they occur again.

- ▶ If necessary: Before turning the ignition in the crane chassis off, note the LICCON error code and the associated time data.
  - ▶ The complete deleting procedure of the error stack must be carried out with the corresponding menu function, see the following description.
  - ▶ Error messages can be transferred into the BSE test system, see section “Transferring error messages into the BSE test system”. In the BSE test system, a screen shot of the error message can be created, see chapter 20.10.
-



B113492

## 2.3 Procedure in case of error messages in the BTT error stack



### Note

- ▶ Operating errors are shown with a delay in the error determination screen - as long as the error control is active.
- ▶ Severe operating errors are shown immediately in the error determination screen.

### 2.3.1 Calling up the error stack BTT

If a system or operating error is present, then an error message appears on the function key **F10**, for example **E**, see illustration 4.

- ▶ Press the function key **F10**.

### Result:

- The start screen of the BTT test system is shown, see illustration 5.
- The existing error is shown in the display area 2.1 or display area 2.2.
- Only the most current error is shown in the start screen of the BTT test system.
- If several error messages are present, then the entire system must be called up in the error stack.



### Note

Assignment of function keys with start screen of the BTT test system ( illustration 5) and in selection menu ( illustration 6)

- ▶ By pressing the function key **F1** the selection cursor 3 is moved down.
- ▶ By pressing the function key **F2** the selection cursor 3 is moved up.
- ▶ By pressing the function key **F3** the selected function of the selection cursor 3 is confirmed and selected.
- ▶ Change to the previous selection level by pressing the function key **F4**.

- ▶ When the option “Error stack” has been selected with the selection cursor 3, see illustration 5:  
Press the function key **F3**.

### Result:

- The selection menu is shown in the error stack, see illustration 6.

- ▶ When the option “Entire system” has been selected with the selection cursor 3:  
Press the function key **F3**.

### Result:

- Active operating and system errors are loaded in the error stack.

7

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 03-04-11 Brake force reduction prevented. Ser
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 03-04-11 function is not carried out

MORE

DOWN

UPDATE

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

8

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 03-04-11 Brake force reduction prevented. Ser
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 03-04-11 function is not carried out

MORE

DELETE

PARAM

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

9

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 03-04-11 Brake force reduction prevented. Ser P0=00006BB2 P1=00000017 P2=00000000 P3=00000000 P4=402507EA
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 03-04-11 function is not carried out P0=00006B5A P1=00000017 P2=00000000 P3=00000000 P4=402507EA

MORE

DELETE

PARAM

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

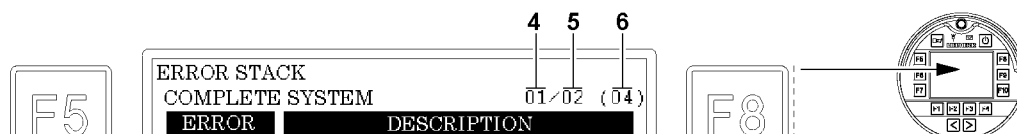
Any existing errors are listed in the error determination screen of the entire system ( illustration 7). In addition, the number of existing errors in the entire system is noted.



#### Note

- ▶ Two errors are shown per page.
- ▶ Example: When four errors are present, two pages with two errors are generated.

B113489



- Counter 4: Called up page
- Counter 5: Total page number
- Counter 6: Number of existing errors in the entire system
- ▶ Note the number of existing errors in the entire system ( counter 6).



#### Note

Assignment of function keys in the error determination screen of the entire system ( illustration 7).

- ▶ The menu for error processing is called up by pressing the function key **F1**.
- ▶ By pressing the function key **F2**, the error determination view is paged by one page (if present).
- ▶ By pressing the function key **F3**, the error stack is read in again.
- ▶ Change to the previous selection level by pressing the function key **F4**.

#### Select the desired page:

- ▶ Press the function key **F2** until the desired page (display in the counter 4) is shown.

#### Calling up the menu for error processing:

- ▶ Press the function key **F1**.

#### Result:

- The assignment of the function keys changes, see illustration 8.
- The “error processing” can be carried out.

## 2.4 Error processing in the BTT error stack

- Errors can be deleted only in the menu for error processing ( illustration 8) and with activated error parameters ( illustration 9).
- All errors are always deleted.
- Individual errors cannot be deleted separately.



#### Note

Assignment of function keys in the error processing ( illustration 8).

- ▶ Change back into the error determination screen of the entire system ( illustration 7) by pressing the function key **F1**.
- ▶ By pressing the function key **F2**, all errors in the entire system are deleted.
- ▶ By pressing the function key **F3**, the error parameters ( illustration 9) are activated.
- ▶ Change to the previous selection level by pressing the function key **F4**.

7

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 08-04-11 Brake force reduction prevented. Ser
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 08-04-11 function is not carried out

MORE

DOWN

UPDATE

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

8

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 08-04-11 Brake force reduction prevented. Ser
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 08-04-11 function is not carried out

MORE

DELETE

PARAM

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

9

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 08-04-11 Brake force reduction prevented. Ser P0=00006BB2 P1=00000017 P2=00000000 P3=00000000 P4=402507EA
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 08-04-11 function is not carried out P0=00006B5A P1=00000017 P2=00000000 P3=00000000 P4=402507EA

MORE

DELETE

PARAM

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4



### 2.4.1 Deleting errors

**Carry out deleting procedure:**

- ▶ Press the function key **F2**.

**Result:**

- All errors in the entire system are deleted.



**Note**

- ▶ Continued active errors are shown again after deletion.
- 

### 2.4.2 Showing the error parameter (error information)

- Error parameters can only be activated from the menu for error processing ( illustration 8).

- ▶ Press the function key **F3**.

**Result:**

- When the error parameters are called up, the error description of every error is expanded, see illustration 9.
- Existing inactive errors are shown in the error stack.



**Note**

Assignment of function keys for activated error parameters ( illustration 9)

- ▶ Change back into the error determination screen of the entire system ( illustration 7) by pressing the function key **F1**. The error parameters remain active.
  - ▶ By pressing the function key **F2**, all errors in the entire system are deleted.
  - ▶ Function key **F3** has no function in this case.
  - ▶ Change to the previous selection level by pressing the function key **F4**.
-

7

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 08-04-11 Brake force reduction prevented. Ser
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 08-04-11 function is not carried out

MORE

DOWN

UPDATE

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

8

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 08-04-11 Brake force reduction prevented. Ser
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 08-04-11 function is not carried out

MORE

DELETE

PARAM

BACK

F8

F9

F10

F1

F2

F3

F4

F1

F2

F3

F4

9

F5

F6

F7

ERROR STACK

COMPLETE SYSTEM01/02 (04)

ERROR	DESCRIPTION
+E:A18970	LSB-EA 1: 12:10/01 control brakes/pneumatic system 08-04-11 Brake force reduction prevented. Ser P0=00006BB2 P1=00000017 P2=00000000 P3=00000000 P4=402507EA
+E:A18E55	LSB-EA 1: 12:13/01 control lighting amperage indicator 08-04-11 function is not carried out P0=00006B5A P1=00000017 P2=00000000 P3=00000000 P4=402507EA

MORE

DELETE

PARAM

BACK

F8

F9

F10

F1

F2

F3

F4

F1

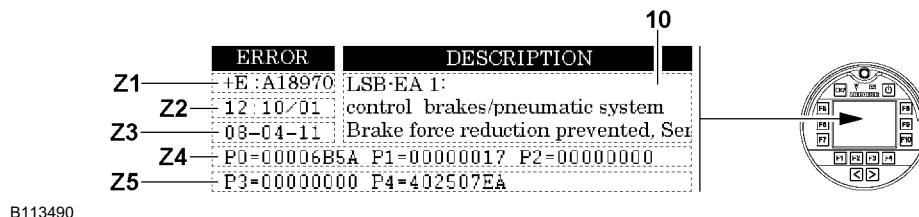
F2

F3

F4

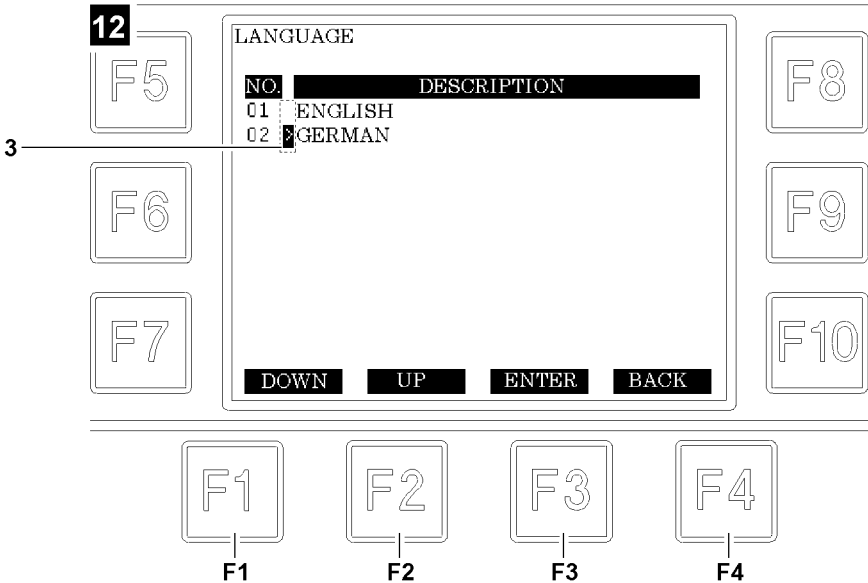
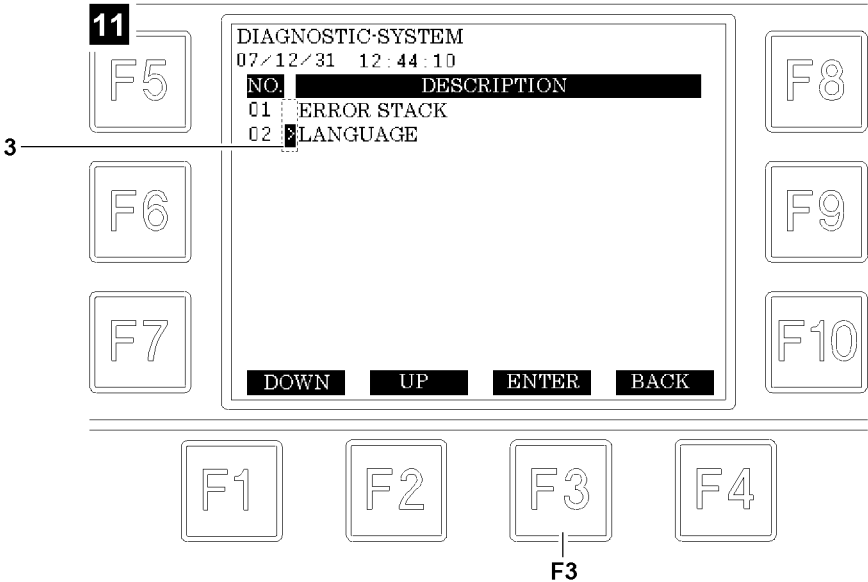
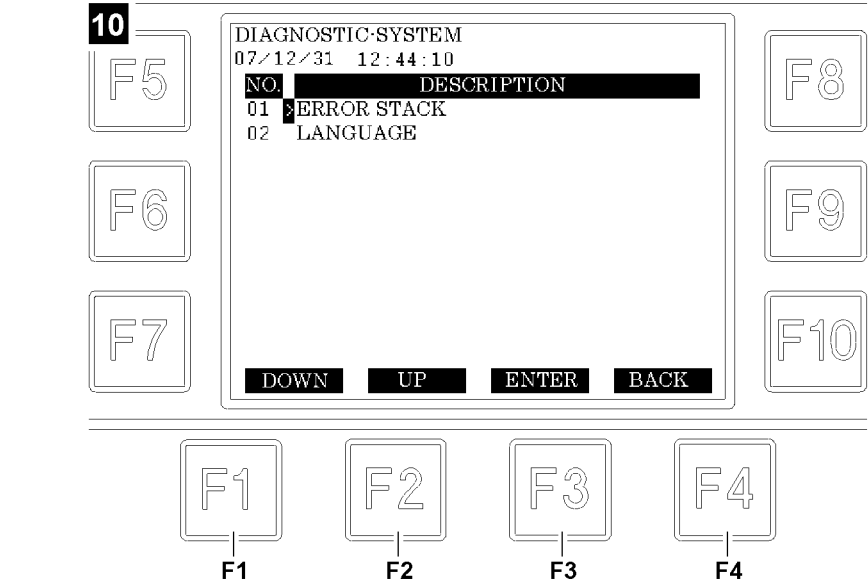
### 3 Error information in the BTT test system

The information of an error as well as the date when the error occurred is distributed to 3 lines. When calling up the sub function **PARAMETER ON** with the function key **F3**, the error text is expanded by the parameters. In addition, existing inactive errors “-E/-B” are shown, see illustration 9.



Line	Type of error	Error text
Z1	<b>±B:</b> = operating error (“+” : active / “-” : inactive) <b>±E:</b> = system error (“+” : active / “-” : inactive)	Display area 10: Description of error
Z2	<b>Time / error frequency</b> When error last occurred/how often error has occurred <b>Note:</b> If the display 00:00 appears as error time, then the error was found while the LICCON computer system booted up!	
Z3	<b>Date (month / day / year)</b> When the error last occurred	
Z4 <sup>1</sup>	<b>Error-specific data in hexadecimal form</b>	
Z5 <sup>1</sup>	<b>Error-specific data in hexadecimal form</b>	

<sup>1</sup> When function “PARAMETER ON” is selected



## 4 Settings in the BTT test system

### 4.1 Changing the language in the BTT test system

The language of the menu texts in the test system can be changed as follows:

Make sure that the following prerequisite is met:

- The start view of the test system is shown on the display of the BTT, see fig. 10.

▶ Press the function key **F1**.

**Result:**

- The selection cursor **3** jumps down by one line, see illustration 11.

▶ Press the function key **F3**.

**Result:**

- The overview is shown in the text languages menu available, see fig. 12.

▶ Move the selection cursor **3** to the desired language via the function key **F1** or function key **F2**.

▶ Press the function key **F3**.

**Result:**

- The menu texts are shown now in the selected language.
- The language of the error texts can only be set in the BSE test system (chapter 20.10).
- The language of the error text in the BTT test system can be changed by Liebherr Service.



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**Note**

- ▶ With the function key **F4**, one gets into the superior menu or back to the start screen of the BTT test system.
- 

### 4.2 Changing the time of day / time zone / date in the BTT test system

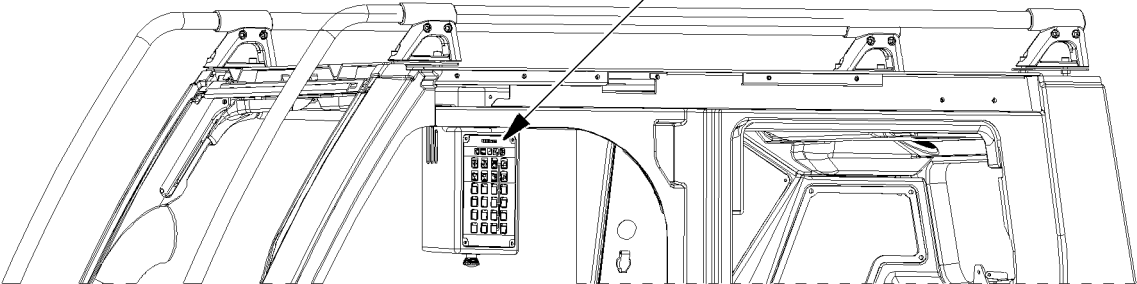
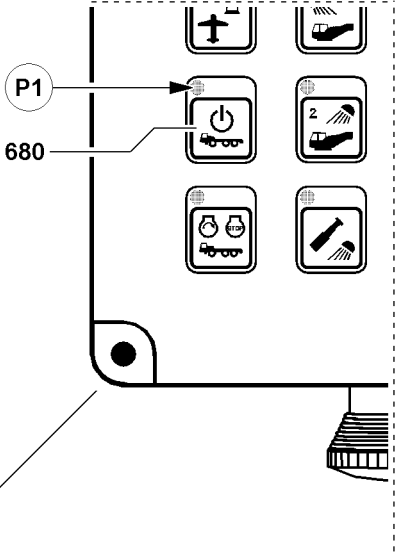
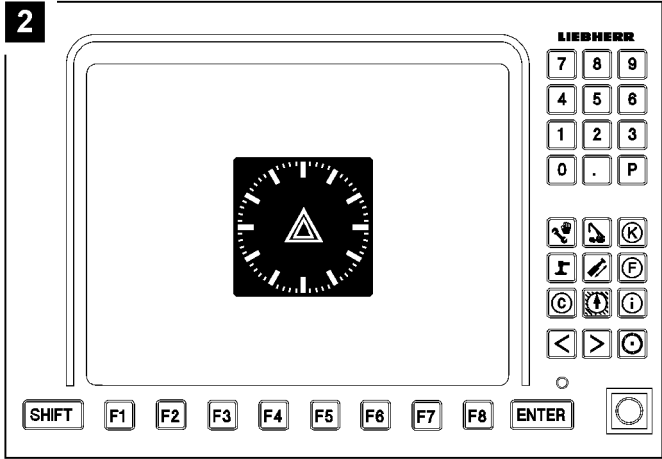
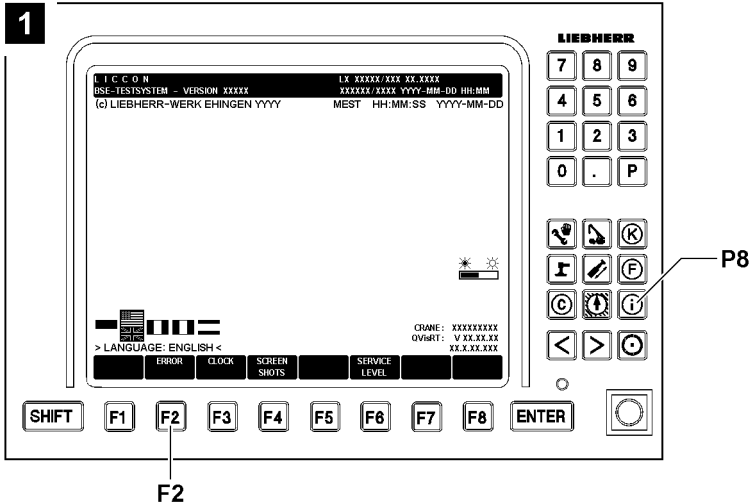


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**Note**

Settings for time of day / time zone / date can only be made by Liebherr Service.

- ▶ For changes of settings for time of day / time zone / date, contact Liebherr Service.
-



## 5 Transferring error messages from the BTT test system to the BSE test system

Error messages from the error stack of the BTT test system can be transferred into the error stack of the BSE test system. The transfer occurs automatically when the BTT test system and the BSE test system are activated simultaneously.

For crane types LR, LTC, LTF and LTR, the BTT test system and the BSE test system are always activated simultaneously.

To be able to activate the BTT test system simultaneously with the BSE test systems on crane type LTM, proceed differently, depending on crane type.

### 5.1 Transferring error messages: Crane with automatically activated LICCON monitor

When the ignition in the chassis is turned on, the LICCON monitor starts automatically too. After a short time, the BSE start screen ( illustration 1) is shown. The BSE test system is activated.

After approx. 2 minutes, the LICCON monitor changes to stand-by operation, see illustration 2. The BSE test system cannot be activated from stand-by operation without an intermediate step.

► **When the BSE start screen is shown in the monitor ( illustration 1):**

Press the function key **F2** on the LICCON monitor.

**Result:**

- Errors from the BTT test system can be seen in the error stack of the BSE test system.
- For a more detailed description of the BSE test system, see chapter 20.10.

► **When the stand-by operation (illustration 2) is shown in the monitor:**

Turn the ignition in the crane chassis off momentarily and turn it on again within two seconds.

**Result:**

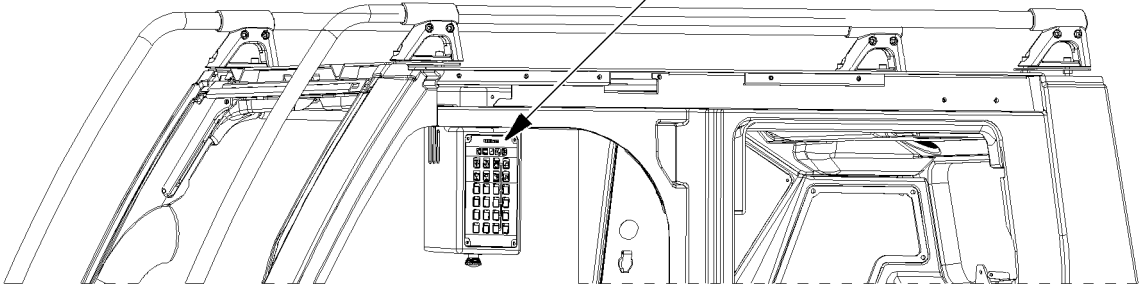
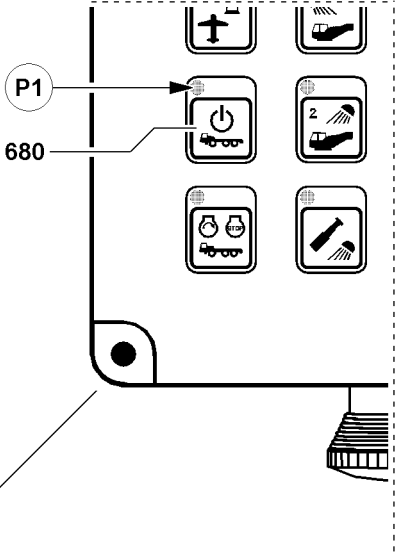
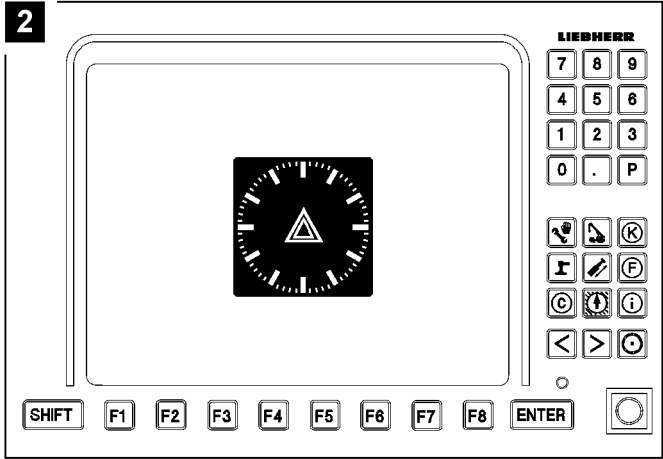
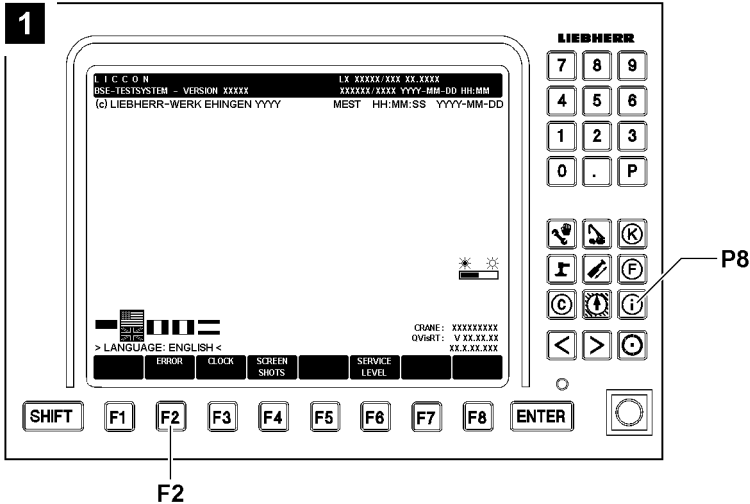
- In the LICCON monitor the BSE start screen is shown ( illustration 1).
- The BSE start screen is only active for two minutes.

► **Within two minutes:**

Press the function key **F2** on the LICCON monitor.

**Result:**

- Errors from the BTT test system can be seen in the error stack of the BSE test system.
- For a more detailed description of the BSE test system, see chapter 20.10.





## 5.2 Transferring error messages: Crane without automatically activated LICCON monitor

If the ignition in the chassis is turned on, the control in the crane superstructure remains off.

To transfer error messages from the BTT test system into the BSE test system, the ignition of the crane chassis must be activated from the crane superstructure.

▶ **Activate the ignition of the crane chassis from the crane superstructure:**

Turn the ignition in the crane chassis off.

▶ Turn the ignition in the crane superstructure on.

**Result:**

- The LICCON computer system starts the LICCON monitor.

▶ When the indicator light on point **P1** does not light up:

Press the button **680** on the BKE.

**Result:**

- The ignition in the crane superstructure is turned on.
- The indicator light on point **P1** lights up.

▶ Press the program button **P8** on the LICCON monitor.

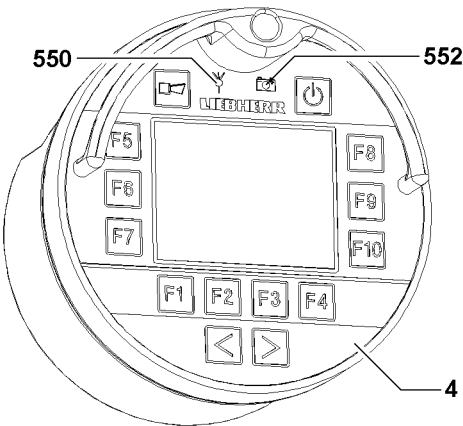
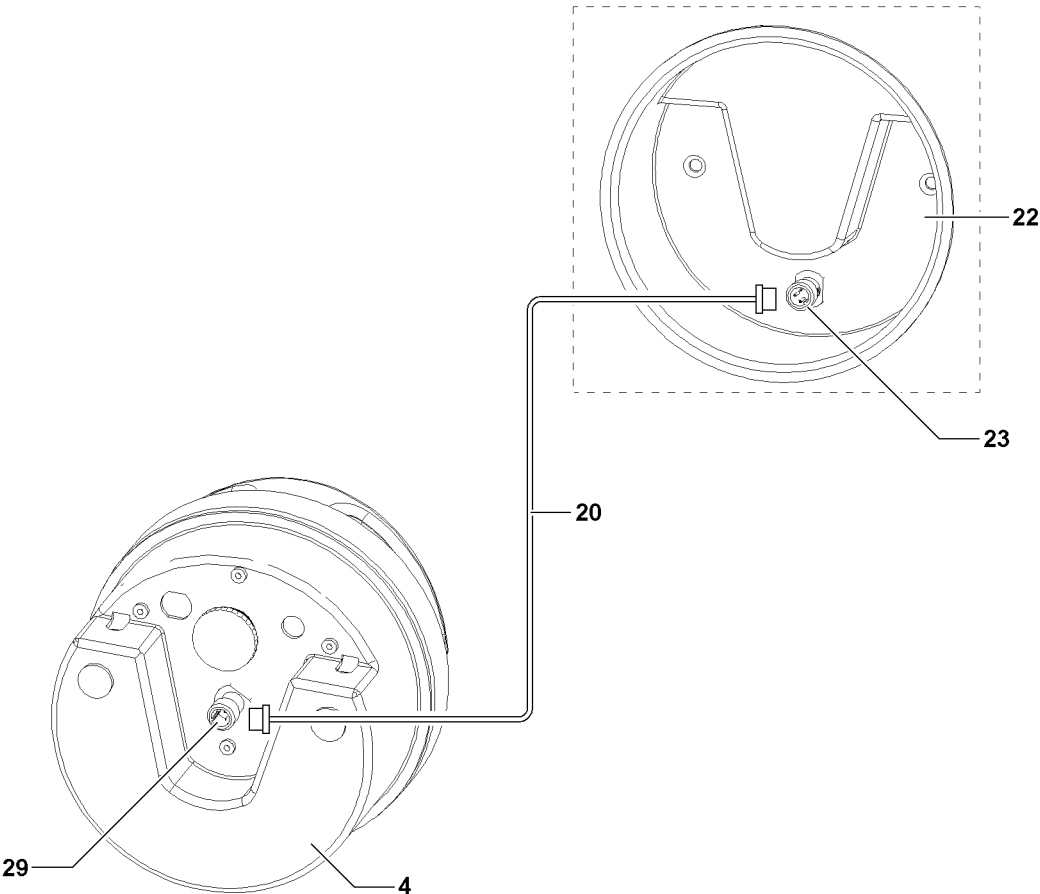
**Result:**

- The BSE test system is active.

▶ Press the function key **F2** on the LICCON monitor.

**Result:**

- Errors from the BTT test system can be seen in the error stack of the BSE test system.
- For a more detailed description of the BSE test system, see chapter 20.10.



## 6 Problems on the operating elements of the BTT and radio remote control (BTT-E)



### Note

- ▶ Applies only for certain crane types with BTT and/or BTT-E (radio remote control)

### 6.1 Problem on Bluetooth™ Terminal (BTT)

#### 6.1.1 The BTT display remains dark



### Note

- ▶ Indicator light Charge condition **552** shows the charge condition.
- ▶ Indicator light Transmission signal **550** shows the quality of the radio contact connection.
- ▶ When the indicator light charge condition **552** does not light up or lights up red:  
Plug the BTT **4** into the charging module **22**.
- ▶ When the LED **552** does not light up with the BTT **4** plugged in or the BTT **4** cannot be turned on:  
Contact Liebherr Service to determine the cause of the problem and further procedure.

#### 6.1.2 Radio connection is faulty

If the radio communication to the BTT **4** is faulty or interrupted (Indicator light Transmission signal **550** lights up red), then it can be bypassed with line **20**.

The radio communication to the BTT **4** can become faulty or interrupted through the following occurrences:

- By interference signals from a nearby radio tower.
- The radio module on the BTT **4** or on the BTB is defective.
- The rechargeable battery in the BTT **4** is discharged.
- Due to bad selection of location by the operator.

### Radio communication interrupted

Make sure that the following prerequisites are met:

- The line **20** to bypass the radio communication has been removed from the switch cabinet of the crane cab.
- The BTT **4** has been removed from the charging module **22** and is turned on.
- The caps on the plug connection **23** and the plug connection **29** have been removed.
- ▶ Screw the line **20** on the charging module **22** onto the plug connection **23**.
- ▶ Screw the line **20** on the BTT **4** onto the plug connection **29**.

### Result:

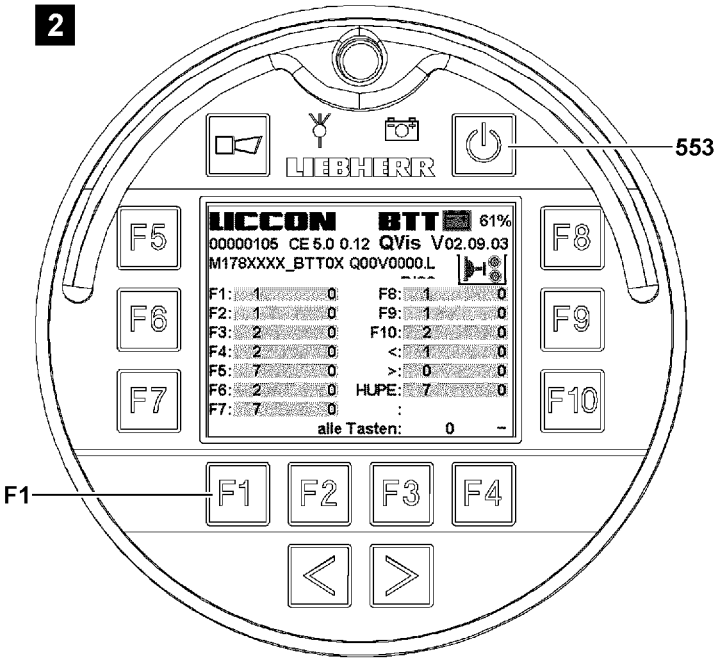
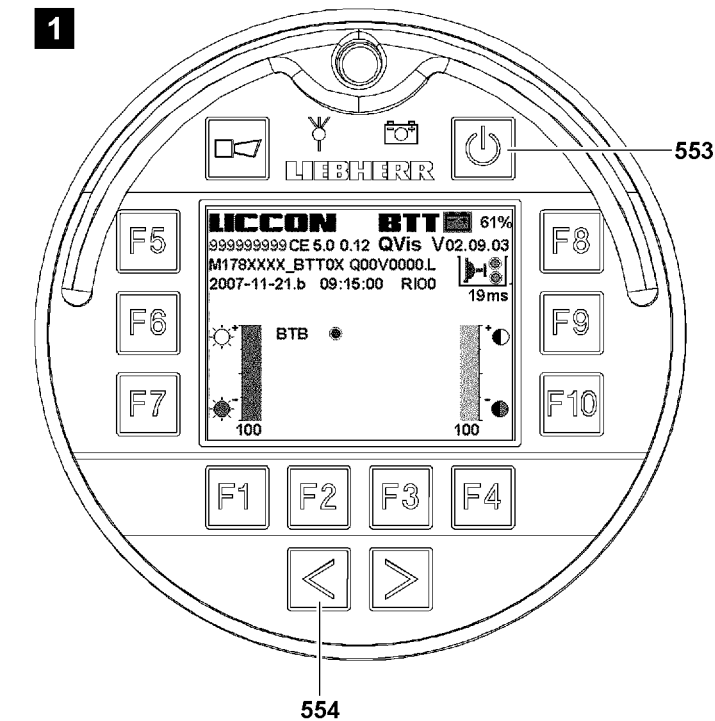
- The radio communication is bypassed.



### Note

If the BTT **4** does not turn on, even though the line **20** is connected with the charging module **22**, then the rechargeable battery may be defective!

- ▶ Contact Liebherr Service to determine the cause of the problem and further procedure.



### 6.1.3 BTT keys without function

If the crane no longer reacts after pressing one or several keys / buttons, then a key test can be called up and carried out.

#### Carrying out a key test

Make sure that the following prerequisite is met:

- The start menu is displayed.
- ▶ Press the button **553** momentarily (max. 1 second) until the system screen ( illustration 1) appears.



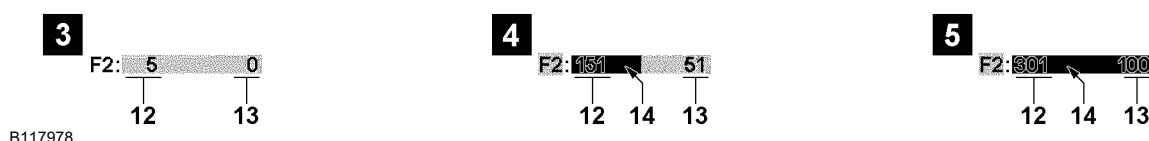
#### Note

- ▶ When the button **553** is pressed too long, the BTT turns off.

- ▶ Press the button **554**.

#### Result:

- Key test ( illustration 2) is called up.



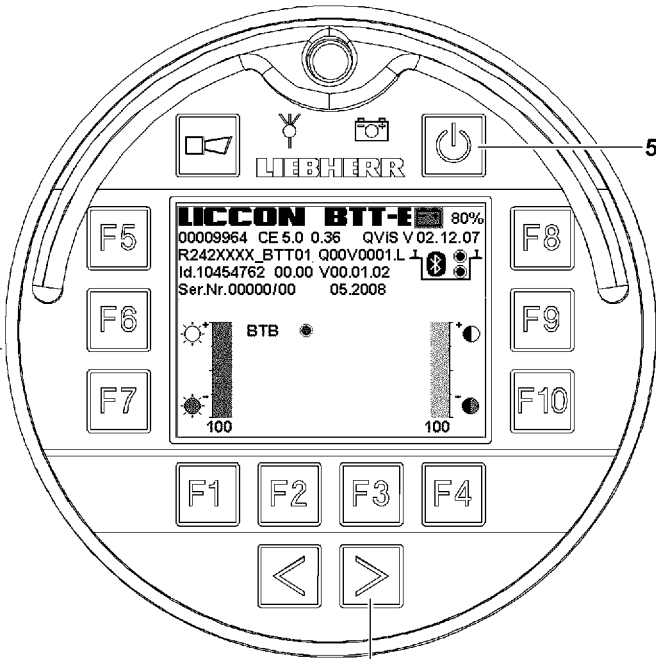
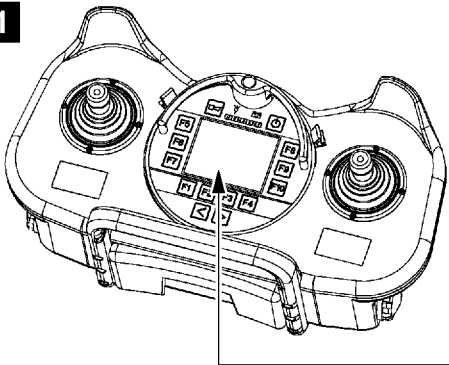
*Example Key test for function key F2*

- **illustration 3** - key is not actuated-
    - Number value current keypress **12** is at “5” (0 to 20 is ok)
    - Percentage value current keypress **13** is at “0”
  - **Illustration 4** -Key is pressed down halfway-
    - Number value current keypress **12** increases to “151”
    - Percentage value current keypress **13** increases to “51”
    - Bar diagram **14** increases to approx. half deflection
  - **illustration 5** - Key is fully pressed down-
    - Number value current keypress **12** increases to “301” (280 to 320 is ok)
    - Percentage value current keypress **13** increases to “100”
    - Bar diagram **14** increases to full deflection
  - ▶ Press the keys individually and monitor the BTT display.
- Result:**
- If the display values change according to the “Example key test for function key F2”, then the key is ok.
  - If the display values change only slightly or not at all despite strong actuation, the key is defective.

#### Ending the key test

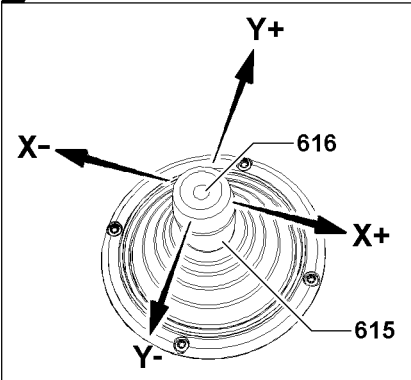
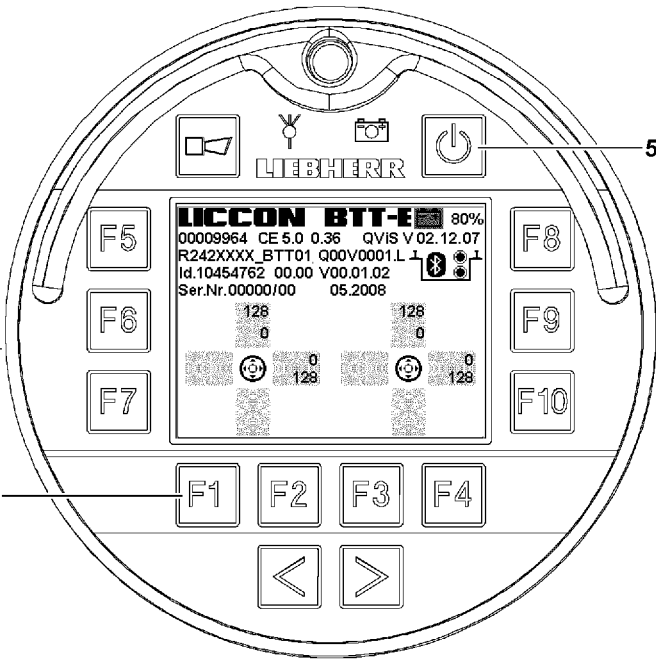
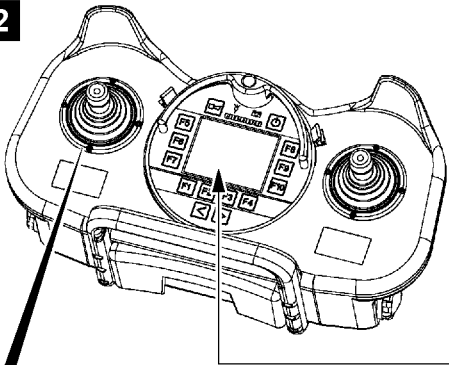
- ▶ To change back to the “System screen”: Press the button **553** briefly.
- ▶ To change back to the System menu: Press the function key **F1**.

1



555

2



B117979

## 6.2 Problem on the radio remote control (BTT-E)

### 6.2.1 Manual control lever of radio remote control without function

If the crane no longer reacts after actuating the manual control levers, then the manual control lever test can be called up and carried out.

#### Carrying out the manual control lever test

Make sure that the following prerequisite is met:

- The start menu is displayed.
- ▶ Press the button **553** momentarily (max. 1 second) until the system screen ( illustration 1) appears.



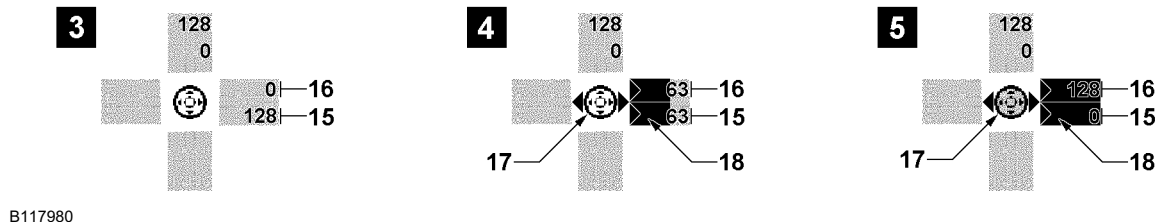
#### Note

- ▶ When the button **553** is pressed too long, the BTT turns off.

- ▶ Press the button **555**.

#### Result:

- The manual control lever test ( illustration 2) is called up.



#### Example Manual control lever test on left manual control lever **615**

- **illustration 3** - Manual control lever **615** is not actuated-
  - 1.Reference value **15** is at “128”
  - 2.Reference value **16** is at “0”
- **illustration 4** - Manual control lever **615** in X-axis to the right, half deflected-
  - 1.Reference value **15** decreases to “63”
  - 2.Reference value **16** increases to “63”
  - Icon **17** with direction arrows in X-axis
  - Bar diagrams **18/19** increase to approx. half deflection
- **illustration 5** - Manual control lever **615** in X-axis to the right, fully deflected, button **616** is actuated-
  - 1.Reference value **15** decreases to “0”
  - 2.Reference value **16** increases to “128”
  - Icon **17** with direction arrows in X-axis and green color
  - Bar diagrams **18/19** increase to full deflection

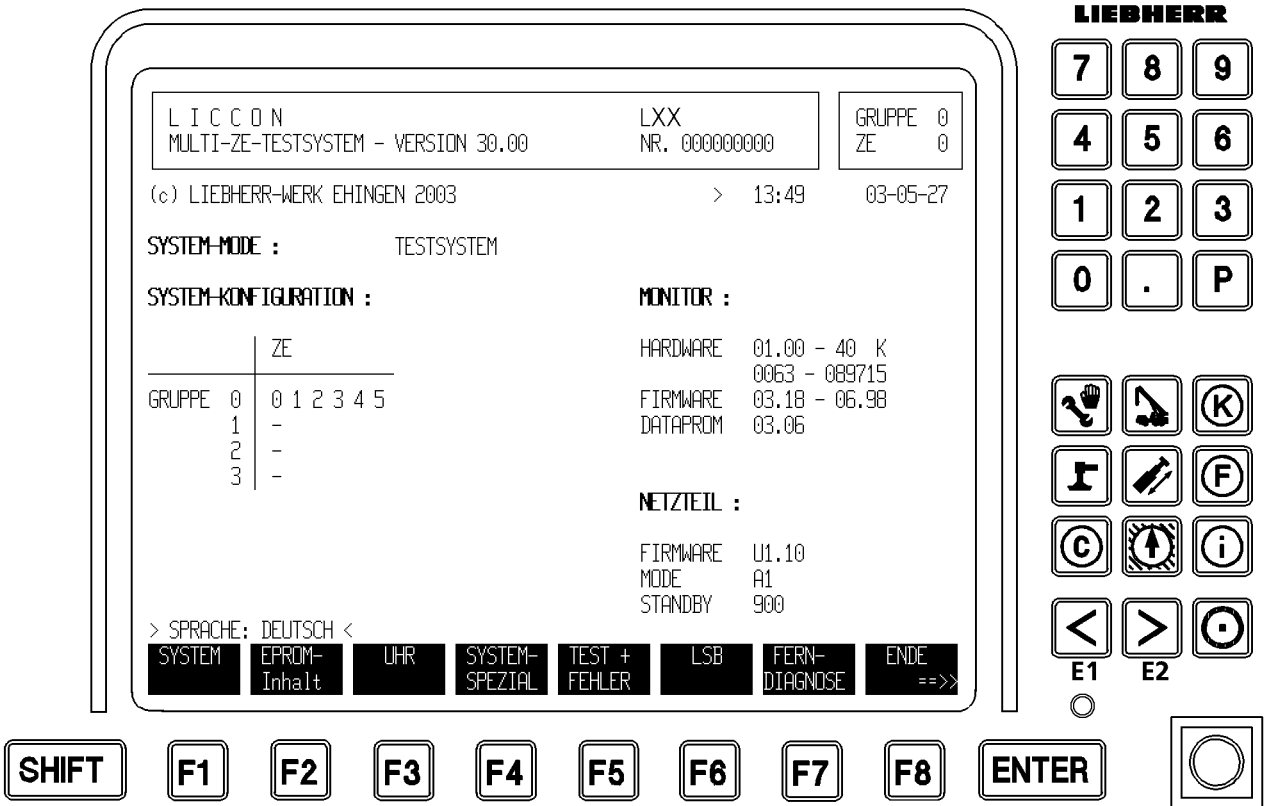
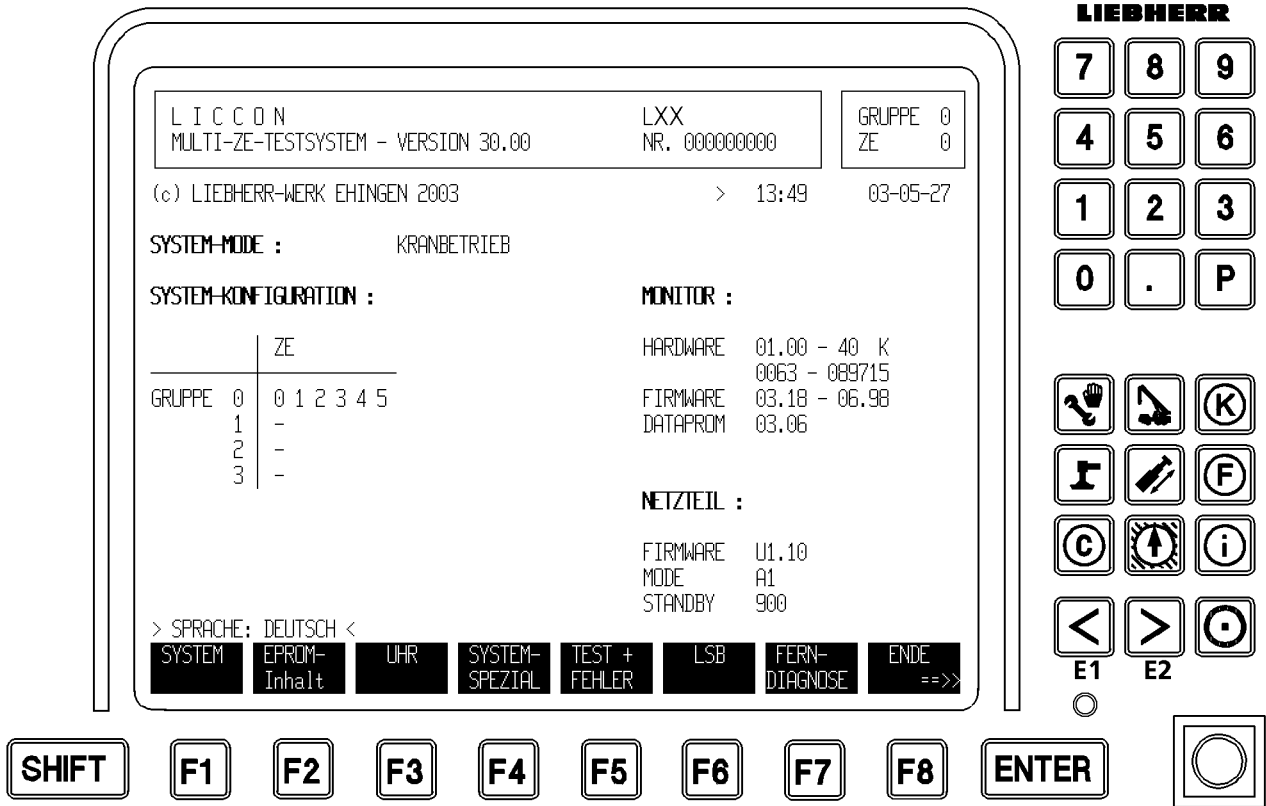
- ▶ Test the manual control levers and monitor the BTT display.

#### Result:

- If the display values change according to the “Example Manual control lever test on left manual control lever **615**”, then the manual control lever is ok
- If the display values change only slightly or not at all, then the manual control lever is defective.

#### Ending the manual control lever test

- ▶ To change back to the “System screen”: Press the button **553** briefly.
- ▶ To change back to the System menu: Press the function key **F1**.





# 1 Multi-CPU test system

The monitor illustrations in this chapter are only examples. The numerical values and crane configurations in the individual illustrations do not have to fit the crane precisely.

The Multi-CPU test system is a diagnostic tool that, among other things, enables malfunctions of LSB components (I/O modules, hoist limit switches, length sensors, angle sensors etc.) on the crane to be located and remedied quickly and easily.

Easy-to-use dialog functions can be used even when the crane is operating to observe all inputs and outputs of the entire system in different representations on the monitor. In addition to this, all registered errors (system errors and operating errors) are documented in the test system.

Certain safety-relevant functions of the Multi-CPU test system are protected from being accessed by operators who are **not** authorized.

Key **E1** and key **E2** are used to select either German or English language versions.

## 1.1 Starting the Multi-CPU test system

The Multi-CPU test system can be started from two possible states:

- from standard operation (crane operation) in **SYSTEM-MODE: CRANE OPERATION**
- on run-up of the LICCON computer system in **SYSTEM-MODE: TEST SYSTEM**

### 1.1.1 System mode “CRANE OPERATION”

The programs and the program flow of the LICCON computer system are not influenced. The crane continues to be fully operable and the control system can be inspected using the extensive aids provided by the Multi-CPU test system.



#### WARNING

Risk of accident!

In system mode “TEST SYSTEM”, the LICCON monitor is only used for functions of the test system. No warnings that indicate that the crane is being operated in fringe ranges will appear.

► Operate the crane with particular care.

► Confirm the operating mode of the crane using the function key **F8**.

► Press program key **P8** (“i”-key).

#### Result:

- The Multi-CPU test system will be started in **SYSTEM-MODE: CRANE OPERATION**.

### 1.1.2 System mode “TEST SYSTEM”



#### WARNING

Risk of accident!

► The crane cannot be operated in system mode “TEST SYSTEM”.

Only those programs which are required for operating the Multi-CPU test system will be started in the LICCON computer system.

For safety reasons, it is not possible to switch from system mode “TEST SYSTEM” to system mode “CRANE OPERATION”. In this case, turn off the LICCON computer system and restart (see previous section “System mode CRANE OPERATION”)

► Start the LICCON computer system.

#### Result:

- An acoustic signal sounds immediately after the LICCON computer system is turned on.

► Now press program key **P8** (“i”-key) within 10 seconds.

**Result:**

- The Multi-CPU test system will be started in **SYSTEM-MODE: TEST SYSTEM**.

**Troubleshooting**

Message **SYSTEM - CHECK . . . . . PASSED - - O.K. !!** displayed on the monitor?

You did **not** press the program key **P8** ("i" -key) within the 10 second time period. You are now in the program "Configuration".

- ▶ In this case, turn off the LICCON computer system, restart and after the acoustic signal has sounded, press the program key **P8** ("i" -key) within 10 seconds.

### 1.1.3 Selecting central processing unit or group

The Multi-CPU test system can only access installed units (Group, CPU).

In the right-hand, upper selection window the cursor flashes to indicate the selection of the desired CPU.

- ▶ Press key **ENTER**.

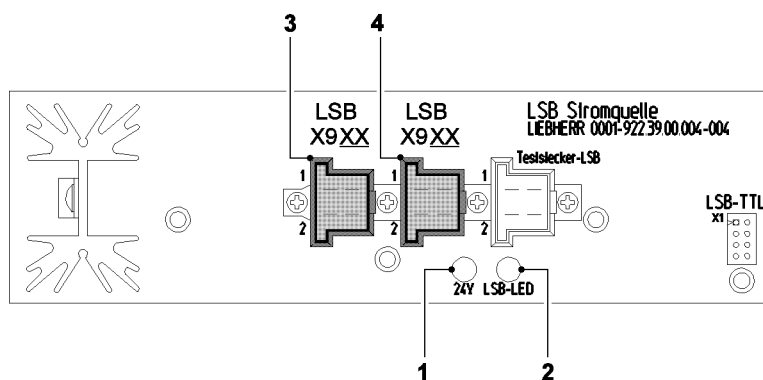
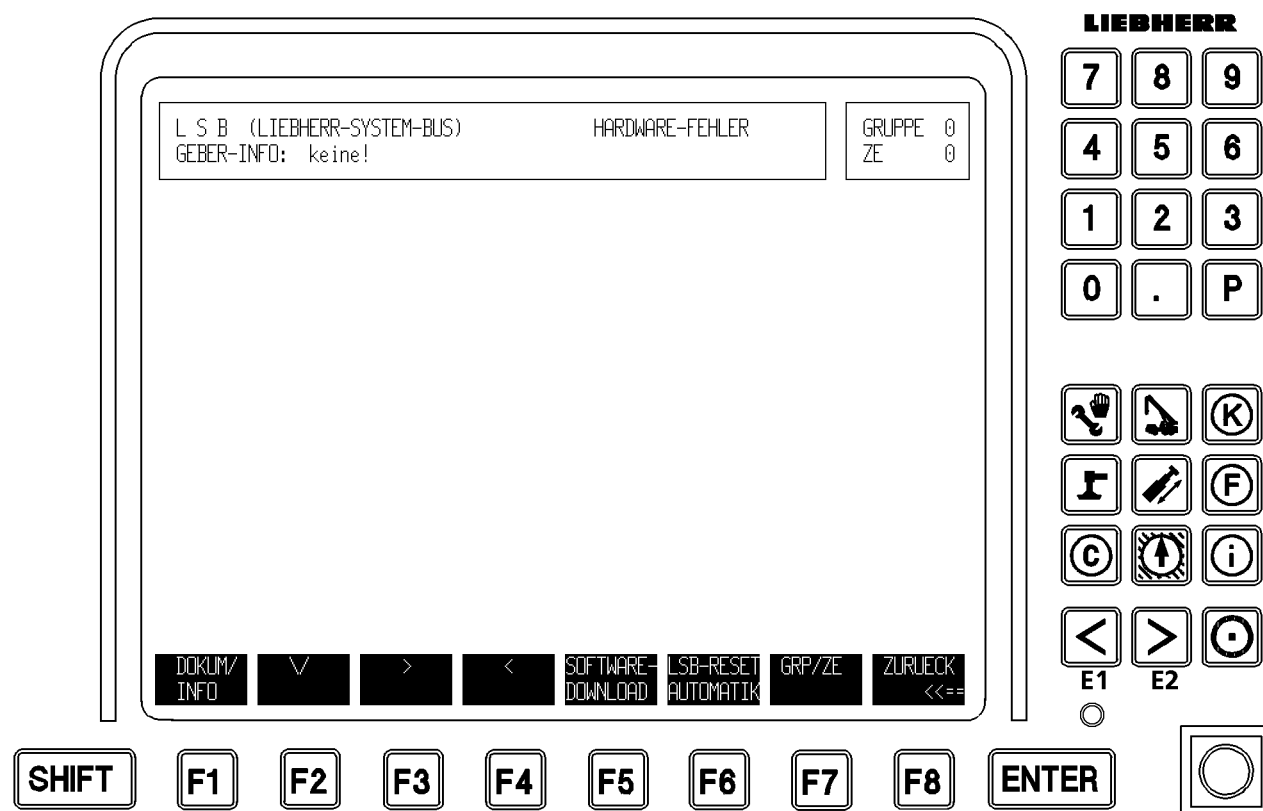
**Result:**

- Cursor changes from "CPU" to "group" and back.
- ▶ Enter the desired group or CPU from the installed units using the numeric keys of the alphanumeric key unit.

**Function key line**

<b>F1</b> SYSTEM	• Access inputs and outputs, system-internal "specialities"
<b>F2</b> EPROM - content	• Software of the LICCON-CPU's
<b>F3</b> CLOCK	• Access-protected function
	• Adjust, stop or start real time clock (battery-buffered)
<b>F4</b> SYSTEM-SPECIAL	• Check the complete function units of the crane (only for authorized expert personnel or LIEBHERR service)
<b>F5</b> TEST + ERROR	• Access errors in the error vaults
<b>F6</b> LSB	• Call up LSB overview
<b>F7</b> REMOTE-DIAGNOSTICS	• Start remote diagnostics*
<b>F8</b> END	• Program end, back to program "Operation"

blank page!



## 1.2 Hardware error

If a hardware error occurs on one LSB bus, then it is shown on the LICCON monitor, see illustration.

### 1.2.1 Error determination

Follow the instructions given in the order below to determine the hardware error.

- Pull the plug **3** and plug **4** of the LSB power source on the input circuit boards **PCB0**, **PCB1**, **PCB2**, **PCB3**, **PCB4** and **PCB5**.



#### Note

- ▶ After pulling the plug connections, the “hardware error” on the LICCON monitor goes off.

- Check the power supply 24 V (green LED) **1**.



#### Note

- ▶ The green LED **1** lights up when the power is connected.

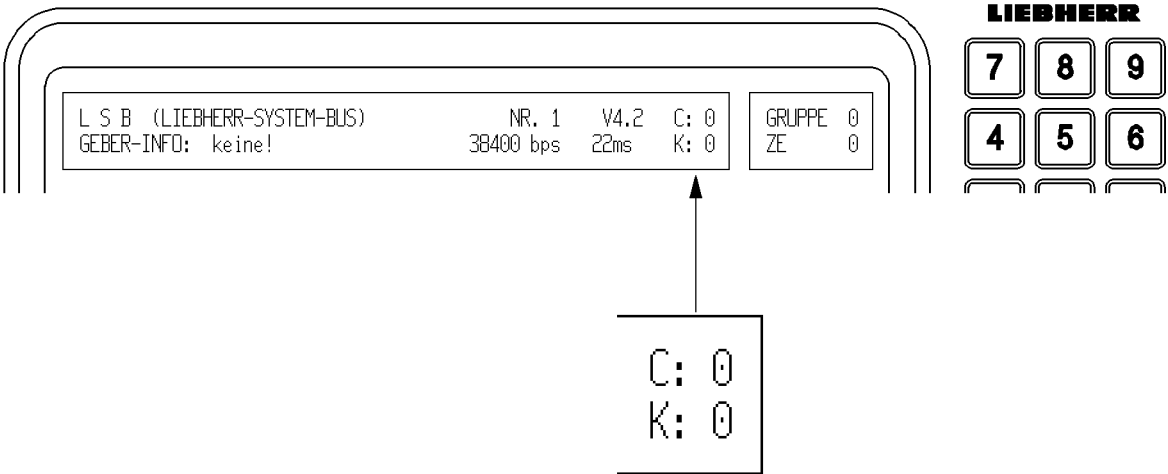
- Check data transfer (red LED) **2**.

LSB board	LED function
Data transfer <b>OK</b>	the red LED <b>2</b> lights up or flickers at a high frequency
Data transfer <b>faulty</b>	red LED <b>2</b> flashes
Short-circuit data line	red LED <b>2</b> is off



#### Note

- ▶ If the data transfer of one or several input circuit boards is faulty, replace the corresponding LSB power source(s) or CPU's.
- ▶ If no problem is shown by the LED's, check the sensors and lines.



### 1.3 LSB overview - general

In the LSB overviews, the LSB detail views “Master” the LSB detail views “Slave”, it is shown in the header line of the corresponding overview if the bus system is functioning properly.



#### Note

- The bus system is constantly monitored for errors or problems.
- If errors or problems arise on the bus system, then they are shown in the header line.

Description of abbreviations:

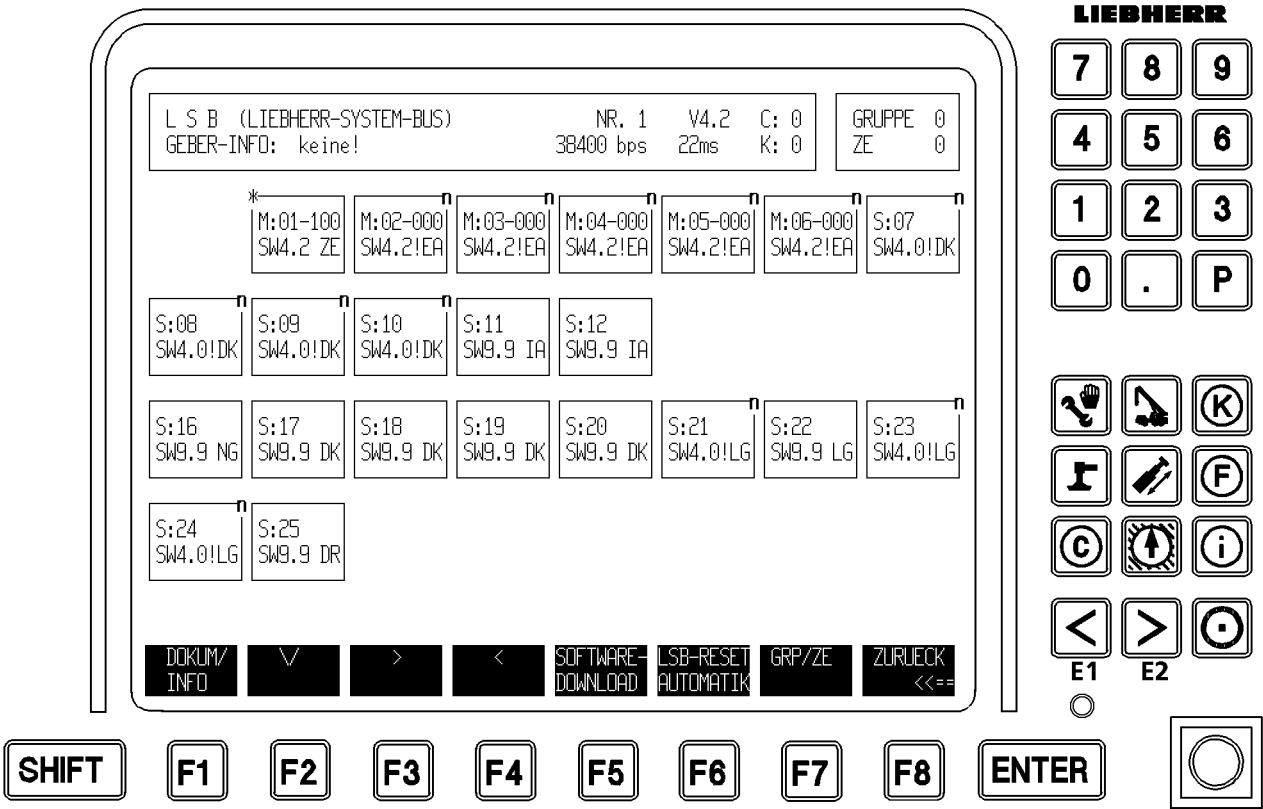
- C: = check (check the bus system that it is free of errors)
- K: = collision (check for collision of bus data)

	Error/fault
C: 0	no
C: 1, .. 2, .. 3, ..	yes (error in the bus system)
K: 0	no
K: 1, .. 2, .. 3, ..	yes (bus data collided)



#### Note

- If a number larger than 0 (zero) is shown, check the bus system!





## 1.4 LSB overview

### 1.4.1 Graphic LSB overview

All LSB components which are located on the “Liebherr-System-Bus” (LSB) are displayed in the overview image of the selected CPU.

The graphic LSB overview is called up using function key **F6 (LSB)**.

Each individual station is assigned a “box” in which the most important information and a symbolic mark are entered.

Display	Meaning
M: or S:	Master (M:) or Slave device (S:)
01	Bus address
1	LSB (only with master device)
00	ID-number (only with master device)
SW4.2	Software version
!CPU	Type identifier CPU, IO, DR, LG, WG, MS, PG, HO, ZM

#### Information

Display	Meaning
M:02 116	Master device bus address 02 - LSB1 - Identification 16 (IOM1)
SW4.2 IO	Software version 4.2 (LSB-driver) - Identification IO
S:23	Slave device - Bus address 23
SW4.2 HO	Software version 4.2 (LSB-driver) - Identification Hoist top
S:23	Slave device - Bus address 23
SW4.2!HO	Software version 4.2 (LSB-driver) - Identification Hoist top “!” = type identifier setpoint/actual deviates from each other
S:23	Slave device - Bus address 23
SW4.2!??	Software version 4.2 (LSB-driver) “!” = type identifier setpoint/actual deviates from each other “??” = invalid type identifier

#### Marks

The marks for the selected LSB components are always located in the left upper corner, the status in the right.

Marks	
*	Selected LSB station
x	Sensor present, but error in its configuration (actual/setpoint value comparison)
o	Sensor not present, although required

Marks	
+	Additional sensor identified, but not configured on bus
s	LSB components (sensors) in simulation mode
n	Optional station (optional) missing

### Function key line

- |                       |  |
|-----------------------|--|
| <b>F1</b> DOKUM/INFO  | • Documentation of the graphically represented LSB overview  |
| <b>F2</b> v           | • Select station (LSB component)   |
| <b>F3</b> >           | • Select station (LSB component)   |
| <b>F4</b> <           | • Select station (LSB component)   |
| <b>F6</b> LSB - RESET | • Reset LSB (LIEBHERR-System-Bus) and reinitialize (Example: newly plugged-in sensor will not automatically be identified) |
| <b>Shift</b>          | • Automatic LSB sensor programming (see section "Procedure for LSB sensor programming")                                    |
| <b>+ F6</b> AUTOMATIC | • Select desired Group or CPU  |
| <b>F7</b> GRP/CPU     | Use the numeric keys to select the desired GROUP or CPU from the installed units   |
| <b>F8</b> BACK        | • Back towards "Main menu"   |

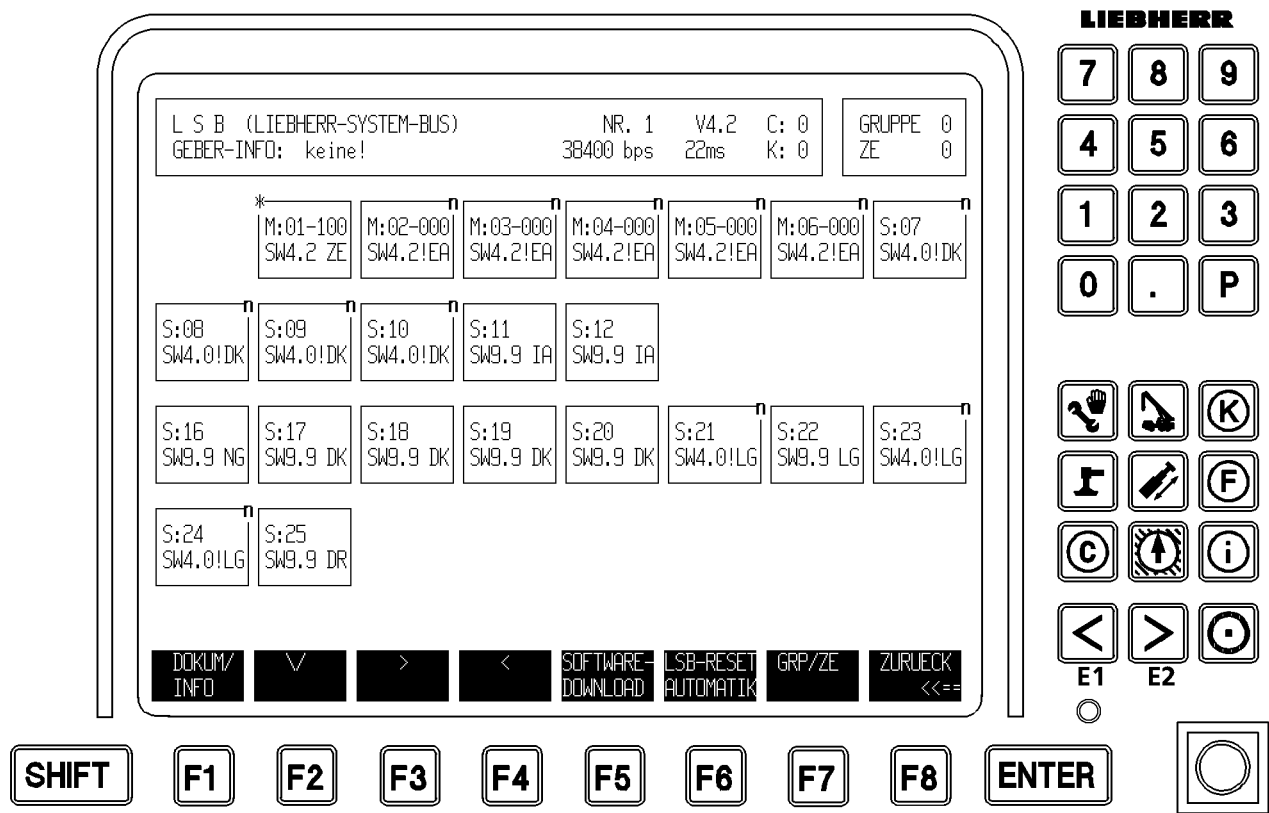
### Calling up individual LSB stations

- ▶ Select individual LSB stations using the function keys described.
- ▶ Press **ENTER** key.

#### Result:

- Selected LSB station will be displayed (see section "LSB detail display")

blank page!



### 1.4.2 Documentary LSB overview

The documentary LSB overview is called up using the function key **F1 (DOCUM)**.

#### Information

ADDRESS	• Bus address
DESCRIPTION	• Description of the LSB station in documentary form
OPERAND	
OPTION	• Customer request

#### Function key line

<b>F1</b> GRAFIC/INFO	• Back to graphic overview
<b>F2</b> v	• Select station
<b>F3</b> ^	• Select station
<b>F4</b> ASSIGN ADDR	• Semiautomatic LSB sensor programming Sensor will be programmed from Address 0 at the target location (see section "Procedure for LSB sensor programming")
<b>F6</b> v	• Scroll to next page
<b>F7</b> GRP/CPU	• Select desired Group or CPU Use the numeric keys to select the desired GROUP or CPU from the installed units
<b>F8</b> BACK	• Back towards "Main menu"

#### Calling up individual LSB stations

- ▶ Select individual LSB stations using the function keys described.
- ▶ Press **ENTER** key.

#### Result:

- Selected LSB station will be displayed (see section "LSB detail display")

L S B (LIEBHERR-SYSTEM-BUS)

MASTER

NR. 3

38400 bps

V4.2

40ms

C: 0

K: 0

GRUPPE 0

ZE 2

o.K. !

INFO	IST	SOLL	DATEN
LSB-ADRESSE	2	2	--
TYP	240/EA	240/EA	
SW	9.9	4.2	
STATUS	0111 0000	0111 0000	
ID	66	66	
NR.	000000000	000000000	
V.R	00.00	00.00	
LSB-NR.	3	3	
SPI	-	-	
CAN	+	+	
LSB(-A)	-	-	
LSB-B	+	+	
Ident-Nr.	000000000		
Serien-Nr.	00000/N00		
Spezi-Nr.	00		

SOFTWARE  
DOWNLOAD

SOFTWARE  
LOESCHEN

EINGANG  
AUSGANG

ZURUECK  
<<==

7

8

9

4

5

6

1

2

3

0

.

P

E1

E2

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER

## 1.5 LSB detail display master

### 1.5.1 I/O module

#### Information

The detail display displays the actual/setpoint value comparison of the type identifier:

LSB-ADDRESS	<ul style="list-style-type: none"> <li>• Address on the bus at which a sensor is addressed. Each station must have a unique address.</li> </ul>
TYPE	<ul style="list-style-type: none"> <li>• Type identifier Each station on the bus is identified by a type identifier. These type identifiers are pre-programmed in the sensor by the manufacturer.</li> </ul>
SW	<ul style="list-style-type: none"> <li>• <b>240</b> Master station (CPU or I/O module) Version number of the sensor firmware Only stations with an identical or higher software version than the required input are compatible with each other.</li> </ul>
STATUS	<ul style="list-style-type: none"> <li>• Operating state of the station in compressed form (see "Hoist limit switch with wind sensor" in the section "LSB detail display slave")</li> </ul>
ID	<ul style="list-style-type: none"> <li>• Additional identification number Unique identification of the station for programmed procedures</li> </ul>
NR.	<ul style="list-style-type: none"> <li>• Device number of the crane Must be the same for all master stations attached to a bus. When the LSB runs up, the system will check whether all components have the same number.</li> </ul>
V.R	<ul style="list-style-type: none"> <li>• Version number of the overall application which is programmed on the I/O module</li> </ul>
LSB-NR.	<ul style="list-style-type: none"> <li>• Displays which bus the I/O module is attached to There can be several busses when there are several CPUs. This will be indicated using consecutive numbering.</li> </ul>
SPI	<ul style="list-style-type: none"> <li>• Characteristic numeral showing which serial operating device is attached to the I/O module</li> <li>• There are three different characteristic numerals:             <ul style="list-style-type: none"> <li>• 1 = driver's cab keypad unit (applies to LTM and LG cranes only!)</li> <li>• 2 = driver's cab display unit (applies to LTM and LG cranes only!)</li> <li>• 3 = support control unit (applies to LTM, LTF and LG cranes only!)</li> </ul> </li> </ul>
CAN	<ul style="list-style-type: none"> <li>• ++ = further components are connected on the I/O module</li> <li>• - = no CAN bus active</li> </ul>
LSB-A	<ul style="list-style-type: none"> <li>• ++ = LSB-A is active on the I/O module</li> <li>• - = no LSB-A active</li> </ul>
LSB-B	<ul style="list-style-type: none"> <li>• ++ = LSB-B is active on the I/O module</li> <li>• - = no LSB-B active</li> </ul>
Ident-no.	<ul style="list-style-type: none"> <li>• Programmed ID number of the LSB station</li> </ul>
Serial no.	<ul style="list-style-type: none"> <li>• Programmed serial number of the LSB station</li> </ul>
Speci no.	<ul style="list-style-type: none"> <li>• Programmed specification number of the LSB station</li> </ul>

L S B (LIEBHERR-SYSTEM-BUS)  
MASTER

NR. 3  
38400 bps

V4.2  
40ms

C: 0  
K: 0

GRUPPE 0  
ZE 2

INFO	IST	SOLL	DATEN
LSB-ADRESSE	2	2	--
TYP	240/EA	240/EA	
SW	9.9	4.2	
STATUS	0111 0000	0111 0000	
ID	66	66	
NR.	000000000	000000000	
V.R	00.00	00.00	
LSB-NR.	3	3	
SPI	-	-	
CAN	+	+	
LSB(-A)	-	-	
LSB-B	+	+	
Ident-Nr.	000000000		
Serien-Nr.	00000/N00		
Spezi-Nr.	00		

SOFTWARE  
DOWNLOAD

SOFTWARE  
LOESCHEN

EINGANG  
AUSGANG

ZURUECK  
<<==

LIEBHERR

789

456

123

0.P

<E1

>E2

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER



**Data**

No data will be displayed with the I/O module or the CPU since these exchange larger-sized data blocks with each other. The contents of these data blocks cannot be read by the user.

**Function key line**

**F5** INPUT OUTPUT

- Call-up of sub-function Input/Output I/O module x (see relevant section)

**F8** BACK

- Back towards "Main menu"

L S B (LIEBHERR-SYSTEM-BUS)  
MASTERo.K. !

NR. 1  
38400 bps

V4.2  
22ms

C: 0  
K: 0

GRUPPE 0  
ZE 0

INFO	IST	SOLL	DATEN
LSB-ADRESSE	1	1	--
TYP	240/ZE	240/ZE	
SW	4.2	4.2	
STATUS	0111 0000	0111 0000	
ID	00	00	
NR.	000000000	000000000	
V.R	01.00	01.00	
LSB-NR.	1	1	
SPI	-	-	
CAN	-	-	
LSB(-A)	+	+	
LSB-B	-	-	
Ident-Nr.	000000000		
Serien-Nr.	00000/N00		
Spezi-Nr.	00		

SOFTWARE  
DOWNLOAD

SOFTWARE  
LOESCHEN

EINGANG  
AUSGANG

ZURUECK  
<<=>

LIEBHERR

789

456

123

0.P

E1

E2

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER

## 1.5.2 Central processing unit (CPU)

### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “I/O module” in section “LSB detail display master”)

### Data

No data will be displayed with the I/O module or the CPU since these exchange larger-sized data blocks with each other. The contents of these data blocks cannot be read by the user.

### Function key line

See “I/O module” in section “LSB detail display master”.

L S B (LIEBHERR-SYSTEM-BUS)  
SLAVE

NR. 3  
38400 bps

V4.2  
37ms

C: 0  
K: 0

GRUPPE 0  
ZE 2

INFO	IST	SOLL	DATEN
LSB-ADRESSE	28	28	1
TYP	54/H0	54/H0	0000
SW	9.9	4.0	+
STATUS	0111 0000	0111 0000	4.7
P0	0	0	0
P1	0	0	
P2	0	0	
P3	0	0	
P4	0	0	
P5	0	0	
P6	74	( 74)	
P7	97	( 97)	
Ident-Nr.	000000000		
Serien-Nr.	00000/NO0		
Spezi-Nr.	00		

DEFAULT-  
WERTE

LSB-  
ADRESSE

TYP

NULLEN

PARAMET

SIMULAT  
EIN

SIMULAT  
AUS

ZURUECK  
<<=




LIEBHERR




789




456




123

0.P











E1E2





SHIFT

F1

F2

F3

F4


F5

F6

F7

F8

ENTER



B194942

132

LIEBHERR

20.10

## 1.6 LSB detail display slave

### 1.6.1 Hoist limit switch with winch sensor (HO)

#### Information

The detail display displays the actual/setpoint value comparison of the type identifier.

LSB-ADDRESS

- Address on the bus at which a sensor is addressed.  
Each station must have a unique address.

TYPE

- Type identifier  
Each station on the bus is identified by a type identifier.
- These type identifiers are pre-programmed in the sensor by the manufacturer:
  - 01 Inductive sensor/digital (ID)
  - 49 Inductive sensor/analog (IA)
  - 50 Angle sensor (WG)
  - 51 Pressure sensor (DK)
  - 55 Inclination sensor (NG)
  - 53 Length sensor (LG)
  - 54 Hoist top/wind sensor (HO)
  - 56 Shaft encoder (SE)
  - 59 Tension measuring lug (ZM)
  - 74 Master switch (MS)
  - 76 Pedal sensor (foot rocker) (PG)

SW

- Version number of the sensor firmware  
Only stations with an identical or higher software version than the required input are compatible with each other.

LIEBHERR

L S B (LIEBHERR-SYSTEM-BUS)  
SLAVE

NR. 3  
38400 bps

V4.2  
37ms

C: 0  
K: 0

GRUPPE 0  
ZE 2

INFO

IST

SOLL

DATEN

LSB-ADRESSE

23

23

67.89 grad

TYP

50/WG

50/WG

SW

9.9

4.0

STATUS

0111 0000

0111 0100

P0

0

0

P1

4

4

P2

42

42

P3

160

160

P4

35

35

P5

255

255

P6

0

( 0)

P7

0

( 0)

Ident-Nr.

000000000

Serien-Nr.

00000/N00

Spezi-Nr.

00

DEFAULT-  
WERTE

LSB-  
ADRESSE

TYP

NULLEN

PARAMET

SIMULAT  
EIN

SIMULAT  
AUS

ZURUECK  
<<=

7

8

9

4

5

6

1

2

3

0

.

P

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER

LIEBHERR

L S B (LIEBHERR-SYSTEM-BUS)  
SLAVE

NR. 0  
38400 bps

V4.2  
0 ms

C: 0  
K: 0

GRUPPE 0  
ZE 0

INFO

IST

SOLL

DATEN

LSB-ADRESSE

24

24

0 cm

TYP

53/LG

53/LG

SW

9.9

4.0

STATUS

0100 0000

0100 0000

P0

0

0

P1

192

192

P2

42

42

P3

231

231

P4

16

16

P5

165

165

P6

0

0

P7

0

0

Ident-Nr.

000000000

Serien-Nr.

0000/N

Spezi-Nr.

00

DEFAULT-  
WERTE

LSB-  
ADRESSE

TYP

NULLEN

PARAMET

SIMULAT  
EIN

SIMULAT  
AUS

ZURUECK  
<<=

7

8

9

4

5

6

1

2

3

0

.

P

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER

### 1.6.2 Angle sensor (WG)

#### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

degrees • Main boom angle to the horizontal in degrees

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”

### 1.6.3 Length sensor (LG)

#### Information

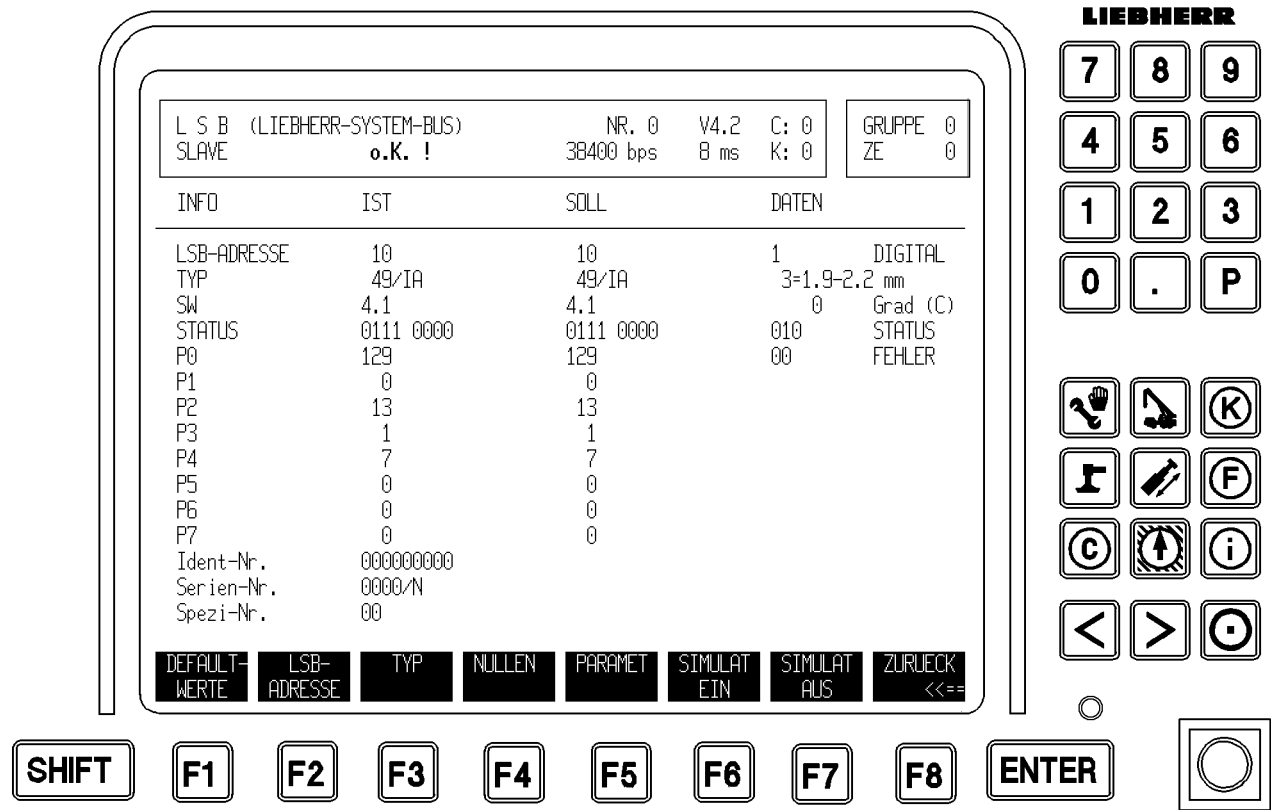
The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

cm • Main boom angle to the horizontal in cm

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”





### 1.6.4 Inductive sensor/analog (IA)

#### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

DIGITAL	• Digital switching information 0 or 1
mm	• Analog value of sensor (3 here), corresponds to the distance 1.9 - 2.2 mm.
DEGREES (C)	• Temperature sensor in °C
STATUS	• Current position of reed contact from which the switching information has been derived
ERROR	• Displays whether the measurement is OK

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”

### 1.6.5 Tension measuring lug (ZM)

#### Information

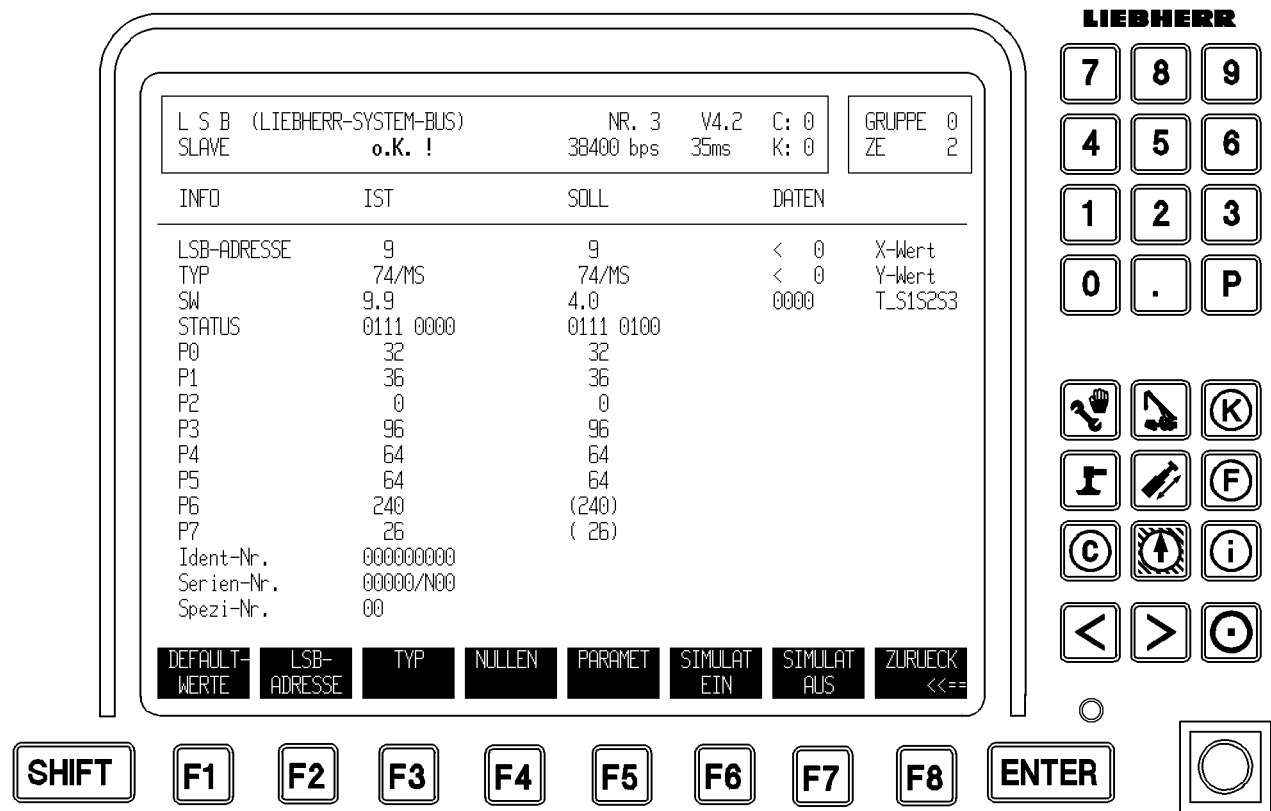
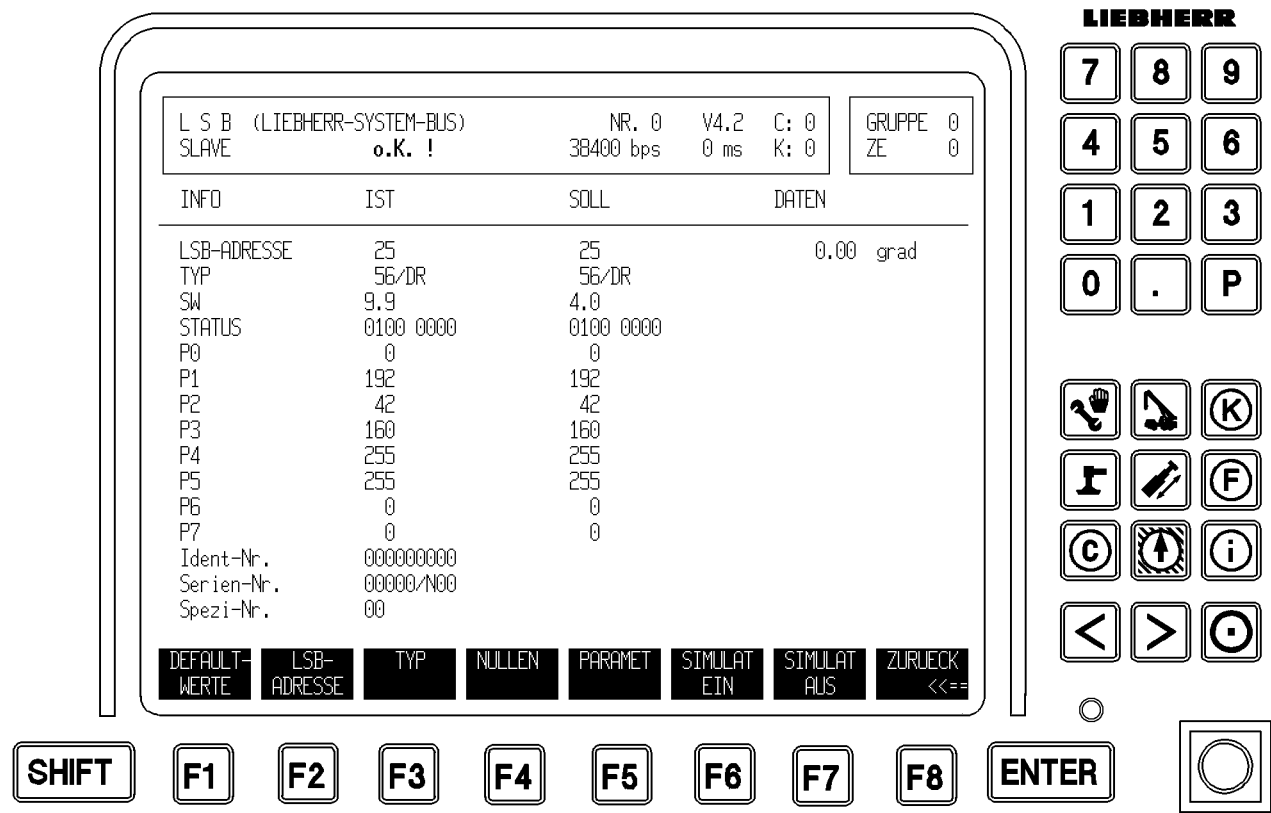
The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

tonnes	• Current tensile force in t
--------	------------------------------

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”



### 1.6.6 Shaft encoder horizontal (DR)

#### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

degrees

- Current position of crane superstructure related to the main work direction “to the rear” in degrees

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”

### 1.6.7 Master switch (MS)

#### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

<0

- **X-value**  
Excursion in X-direction in %

<0

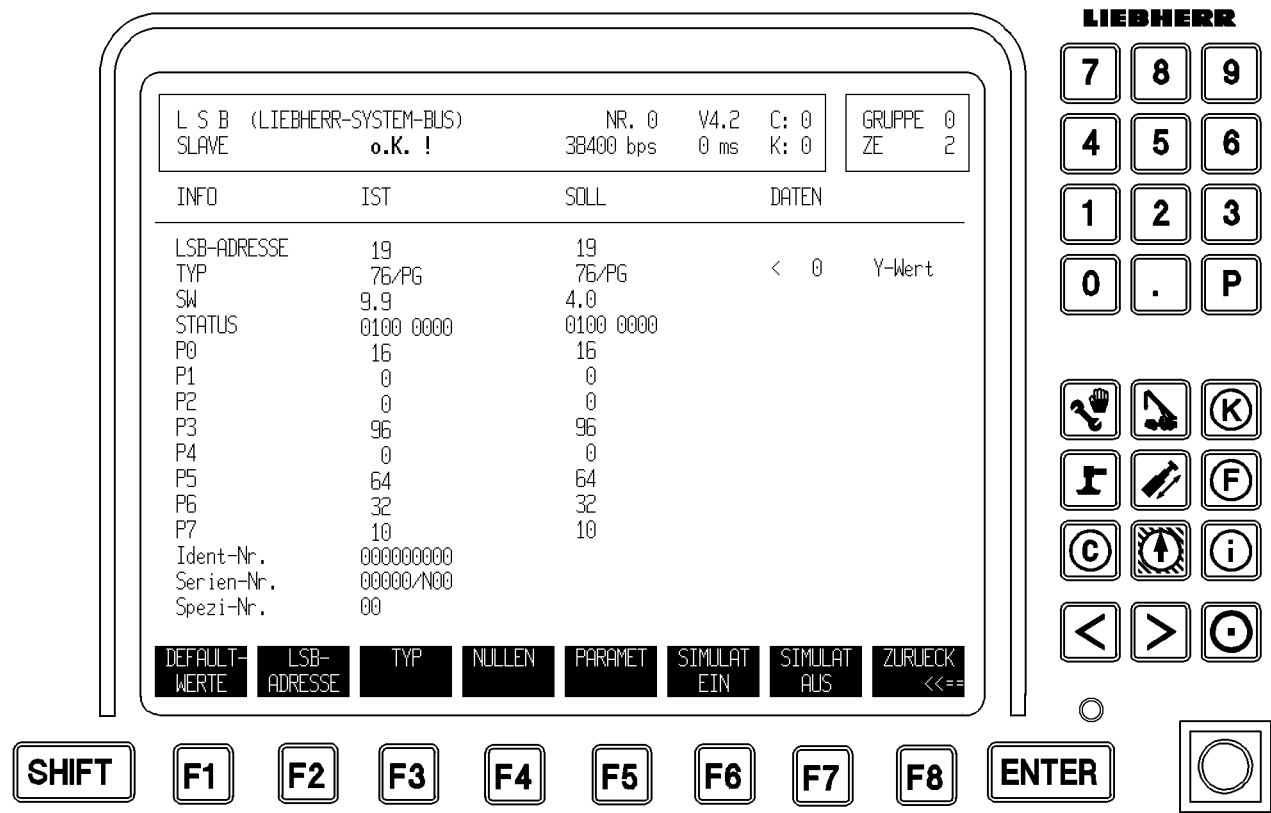
- **Y-value**  
Excursion in Y-direction in %

0000

- **T\_S1S2S3**  
Keypad assignment on master switch

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”



### 1.6.8 Pedal sensor (PG)

#### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

<0

#### • Y-value

Excursion in Y-direction in %

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”

### 1.6.9 Pressure sensor (DK)

#### Information

The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

bar

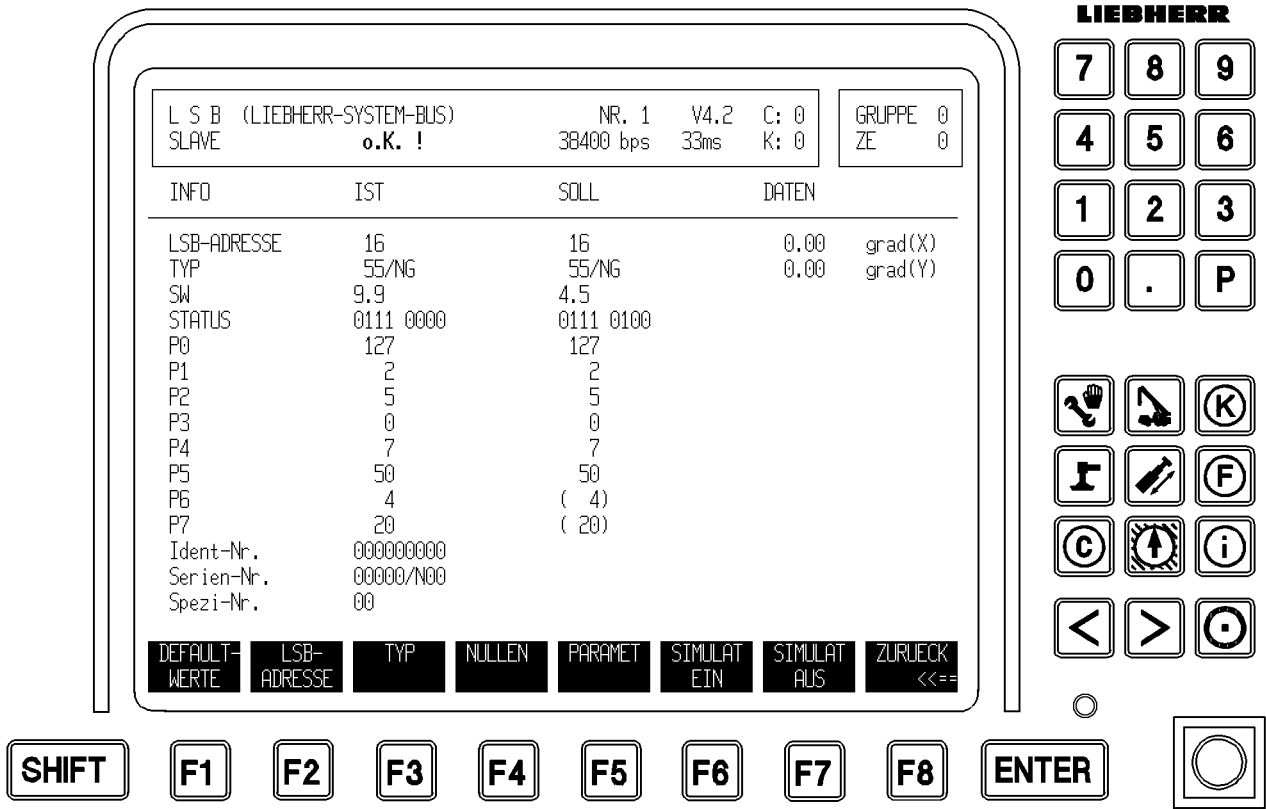
#### • Pressure in bar

Degrees (C)

#### • Temperature sensor in °C

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”



### 1.6.10 Inclination sensor (NG)

#### Information

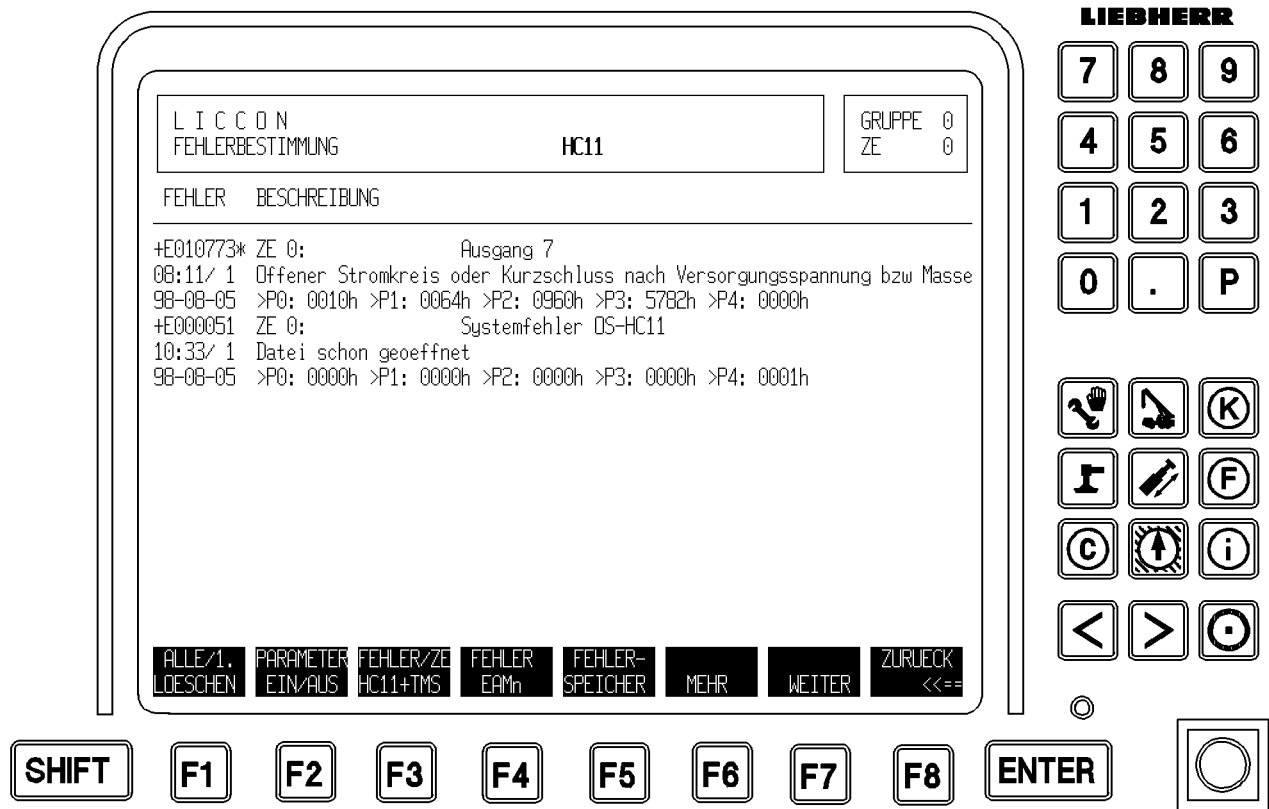
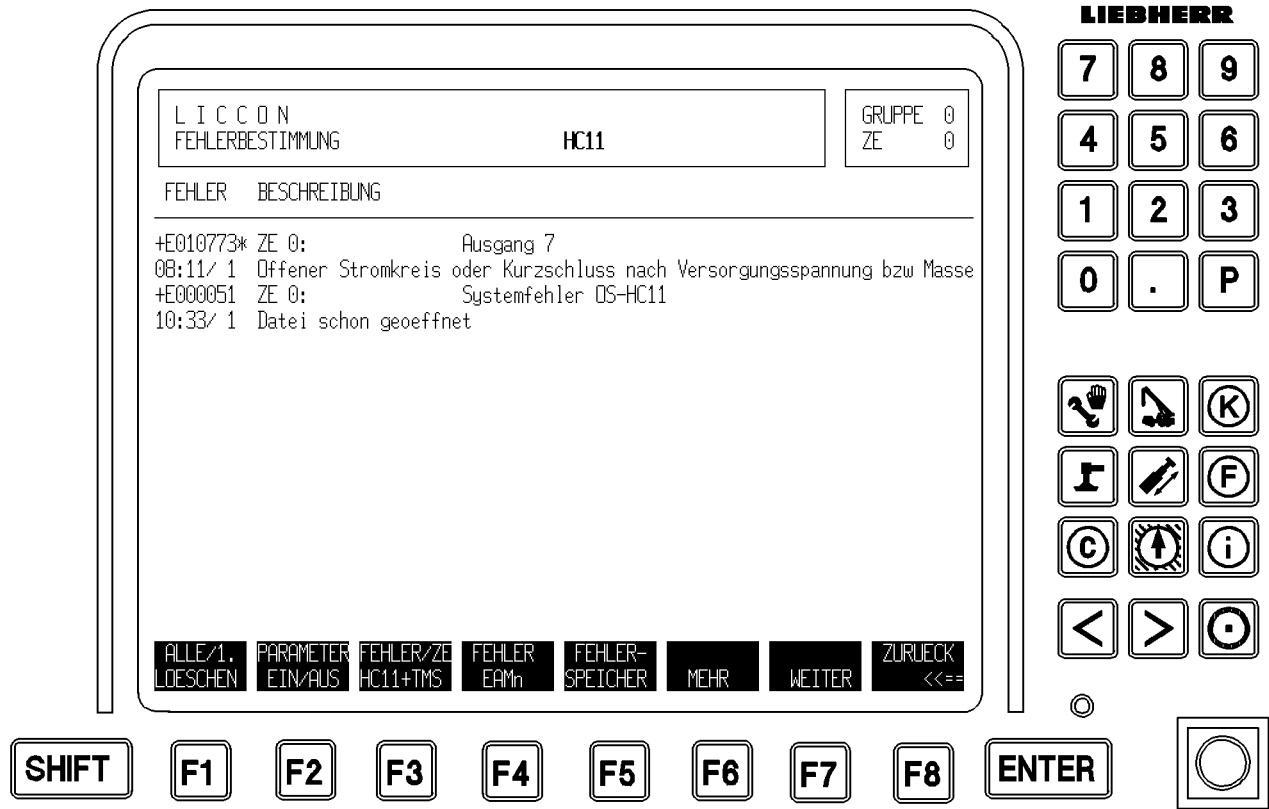
The actual/setpoint value of the type identifier will be displayed in the detail display (see “Hoist limit switch with wind sensor” in section “LSB detail display slave”)

#### Data

degrees (X)	• Inclination of crane in X-direction in degrees
degrees (Y)	• Inclination of crane in Y-direction in degrees

#### Function key line

see “Hoist limit switch with wind sensor” in section “LSB detail display slave”





## 1.7 LICCON error determination

Malfunctions in the LICCON computer system generate error messages. A distinction is made here between **operating errors** and **system errors** (see chapter 20.05).

System errors can also be subdivided into:

- **Active system errors**  
Errors which occur persistently (Example: cable break, sensor defective, etc.)  
Marked with a “+”
- **Inactive system errors**  
Errors which only occur momentarily (Example: loose contact, temporary sensor failure, etc.)  
Marked with a “-”

### 1.7.1 Error vault

Each central processing unit possesses a processor HC11 and TMS. These processors each possess a memory area (error vault) in which up to 9 errors can be stored. In addition, each I/O module also possesses an error vault in which up to 9 errors can be stored. All errors which appear with the LICCON-Error-Code (LEC) are displayed together with their error number and stored and documented in the relevant error vault.

- If the error vault of one processor is full (9 errors), inactive errors will be overwritten by new active errors.
- It is not possible to store any further system errors in the error vault if only active system errors are present in the error vault.
- If the error vault contains active system errors, one of the system errors will be overwritten when an operating error occurs.
- If an error continues to persist or the cause of error has not been rectified, a new active error message will be generated and displayed when the error re-occurs, i.e. with a new date and time.



#### Note

Deleting errors in the error vault!

Switching off the ignition will delete all error messages (active and inactive) stored in the error vaults.

- ▶ Proceed with caution when turning off the ignition!
- ▶ If necessary, make a note of error number(s) with their associated error text(s) before switching off the ignition!

You will find information on storing errors in non-volatile error memories of the power unit in the section “Error memory”.

#### Determining errors from the Operation, Telescoping, Configuration, Support programs

If there is a system error or operating error, an error message will appear in the symbol element “Horn” above the function key **F8**, for example **E:0HC11**.

- ▶ Press function key **F8**.

#### Result:

- Acoustic signal is switched off.

- ▶ Press function key **F8** again.

#### Result:

- Multi-CPU test system for error identification is called up.
- Automatic change to error vault where the first error identified is stored.

#### Calling up the Multi-CPU test system

- ▶ Press program key **P8** (“i”-key).

#### Result:

- “Test system” program is called up.

► Select CPU in main menu.

► Press function key **F5**.

**Result:**

– Sub-function “Test + Error” is called up.

► Press function key **F5** again.

**Result:**

– Sub-function “Test” is called up.

► Press function key **F3**, function key **F4** or function key **F5**.

**Result:**

– Error vault HC11, TMS or IOMn is selected.

► If function key **F7** is pressed again:  
Each IOM error vault will be displayed.

**Information**

The error information is split into 2 lines. This is extended to 3 lines when the sub-function **PARAMETER ON** is selected using function key **F2**. The third line displays the error-specific data and date of occurrence. In addition, all errors which are no longer active will be displayed (inactive errors “-”).

Line	Display		
	<b>Meaning</b>		
1st line:	± LEC (*)	Device-Code	Error path
	+ = active error - = inactive error <sup>1</sup> LEC = LICCON-Error-Code * = 1. error on page1 of the selected error vault	Module generating error	Error source
2nd line:	Time/error frequency	Type of error	
	When error last appeared/how often error has occurred	Documentary description of error	
3rd line: <sup>1</sup>	Date	Error-specific data in hexadecimal form	

<sup>1</sup>When function “PARAMETER ON” is selected

blank page!




LIEBHERR




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456




123

0.P









L I C C O N

FEHLERBESTIMMUNG

HC11

GRUPPE 0

ZE 0

FEHLER    BESCHREIBUNG

- kein aktueller FEHLER-Eintrag !! -

ALLE/1.  
LOESCHEN

PARAMETER  
EIN/AUS

FEHLER/ZE  
HC11+TMS

FEHLER  
EAMn

FEHLER-  
SPEICHER

MEHR

WEITER

ZURUECK  
<<==

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER






LIEBHERR




789




456




123

0.P









L I C C O N

FEHLERBESTIMMUNG

HC11

GRUPPE 0

ZE 0

FEHLER    BESCHREIBUNG

- FEHLER geloescht !! -

ALLE/1.  
LOESCHEN

PARAMETER  
EIN/AUS

FEHLER/ZE  
HC11+TMS

FEHLER  
EAMn

FEHLER-  
SPEICHER

MEHR

WEITER

ZURUECK  
<<==

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER



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**Error vault empty**

The empty state of the selected error vault is dependent on the sub-function "PARAMETER ON" or "PARAMETER OFF":

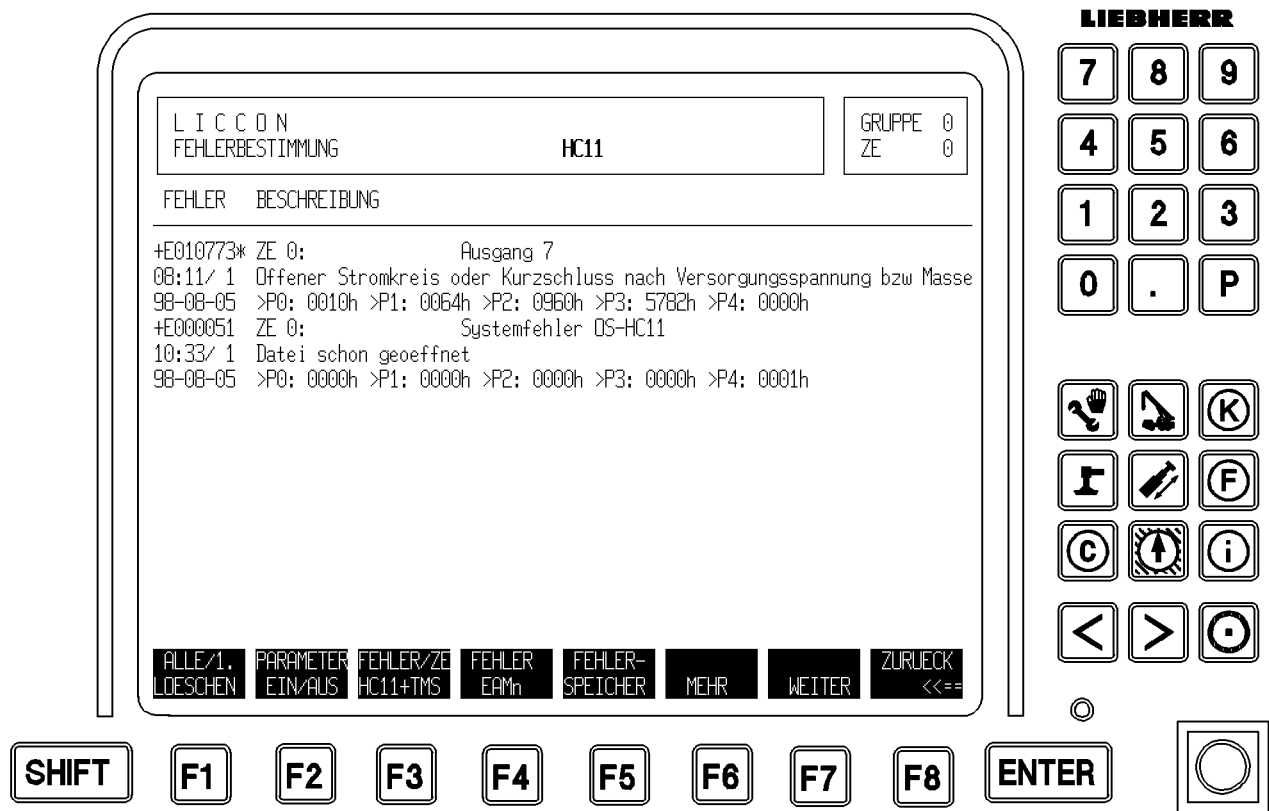
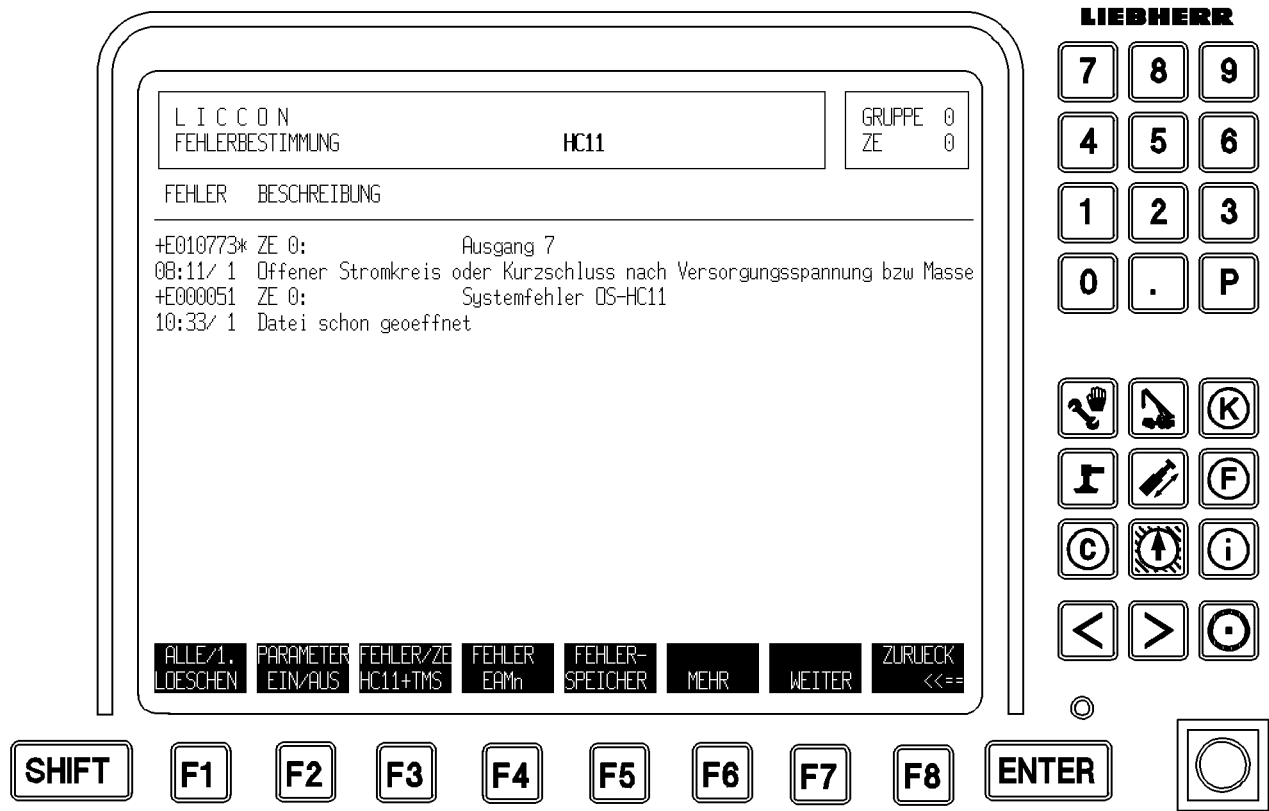
– **Sub-function PARAMETER OFF:**

If there is no active error and no operating error, the information "- no current ERROR entry !! -" will be displayed on the monitor.

There may, however, still be inactive errors present in the error vault. In order to display these, call up sub-function PARAMETER ON using function key **F2**.

– **Sub-function PARAMETER ON:**

If the error vault is completely empty, meaning that there are no old or inactive errors stored still, the information "- ERROR deleted !! -" will be displayed on the monitor.



**Function key line**

<b>F1</b> ALL/1ST DELETE	<ul style="list-style-type: none"><li>• Delete all errors Active errors will be re-displayed together with the current date.</li><li>• Use <b>SHIFT + F1</b> to delete the 1st error (*) on page 1 of the error vault.</li></ul>
<b>F2</b> PARAMETER ON/OFF	<ul style="list-style-type: none"><li>• Detailed representation of the error vault</li><li>• Active and inactive errors, as well as operating errors are on a third line together with the additional info. date and the parameters P0...P2 (P4).</li><li>• In PARAMETER REPRESENTATION ON a maximum of 5 error entries per page can be seen.</li><li>• Call up HC11 or TMS error vault</li></ul>
<b>F3</b> ERROR/CPU HC11 + TMS	
<b>F4</b> ERROR IOMn	<ul style="list-style-type: none"><li>• Call up of error vault from I/O module 1</li><li>• Press function key <b>F7</b> again: Error vaults of all I/O modules will be called up.</li><li>• Use <b>SHIFT + ERROR IOMn</b> to reopen the first error page of the selected I/O module.</li></ul>
<b>F5</b> ERROR MEMORY	<ul style="list-style-type: none"><li>• Call up the stored error state</li><li>• Use <b>Shift + F5</b> to store all currently existing errors in non-volatile error memories of the power unit.</li></ul>
<b>F6</b> MORE	<ul style="list-style-type: none"><li>• Call up more error pages (if present)</li></ul>
<b>F7</b> FURTHER	<ul style="list-style-type: none"><li>• Press again: All error vaults will be called up one after the other.</li></ul>
<b>F8</b> BACK	<ul style="list-style-type: none"><li>• Back towards "Main menu"</li></ul>

LIEBHERR

7

8

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4

5

6

1

2

3

0

.

P

L I C C O N  
FEHLERBESTIMMUNG

SPEICHER: 98-09-03 13:57

GRUPPE 0  
ZE 0

FEHLER

BESCHREIBUNG

0/ 0

Fehler speichern <ENTER>

ALLE/1.  
LOESCHEN

PARAMETER  
EIN/AUS

FEHLER/ZE  
HC11+TMS

FEHLER  
EAMh

FEHLER-  
SPEICHER

MEHR

WEITER

ZURUECK  
<<==

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER



LIEBHERR

7

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4

5

6

1

2

3

0

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P

L I C C O N  
FEHLERBESTIMMUNG

SPEICHER: 98-09-03 14:13

GRUPPE 0  
ZE 0

FEHLER

BESCHREIBUNG

3/ 3

+E010773 ZE 0: Ausgang 7

14:11/ 1 Offener Stromkreis oder Kurzschluss nach Versorgungsspannung bzw Masse

+E030064 ZE 0: LMB

14:11/ 3 gemessenes Gesamtmoment kleiner als halbes Leermoment

ALLE/1.  
LOESCHEN

PARAMETER  
EIN/AUS

FEHLER/ZE  
HC11+TMS

FEHLER  
EAMh

FEHLER-  
SPEICHER

MEHR

WEITER

ZURUECK  
<<==

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER



B194972



### 1.7.2 Error memories

A distinction is made between two possibilities:

- 1.) Driving mode
- 2.) Crane operation

In **Driving mode** there are the following two options (**only applies to LTM and LG cranes**):

- Crane types with one engine (UW) or with two engines (OW + UW) **and** change-over from superstructure operation to chassis operation  
Here, momentarily or persistently occurring errors cannot be stored in the error memory of the power unit. When the ignition in the chassis is switched off, all errors in the error memory are automatically cleared.  
Since you have to switch off the ignition in the UW in order to start the LICCON computer system in the OW, you should note down any errors before switching off the ignition.
- Driving mode in the case of crane types with two engines (OW + UW) **without** Change over from superstructure operation to chassis operation  
Momentarily or persistently occurring errors (maximum of 160) can be stored in a non-volatile error memory (RAM) of the power unit. Since you can start the LICCON computer system in the superstructure independently of the chassis it is possible to store the errors in the error vault.

With **Crane operation**, momentarily or persistently occurring errors (maximum of 160) can be stored via the LICCON monitor in a non-volatile error memory (RAM) of the power unit independently of the number of engines on the crane.

#### Storing errors

- ▶ Press the key combination **SHIFT + F5**.
- ▶ Confirm storage using the key **ENTER**.

#### Result:

- All current errors are stored.

#### Calling up stored errors in the error determination screen

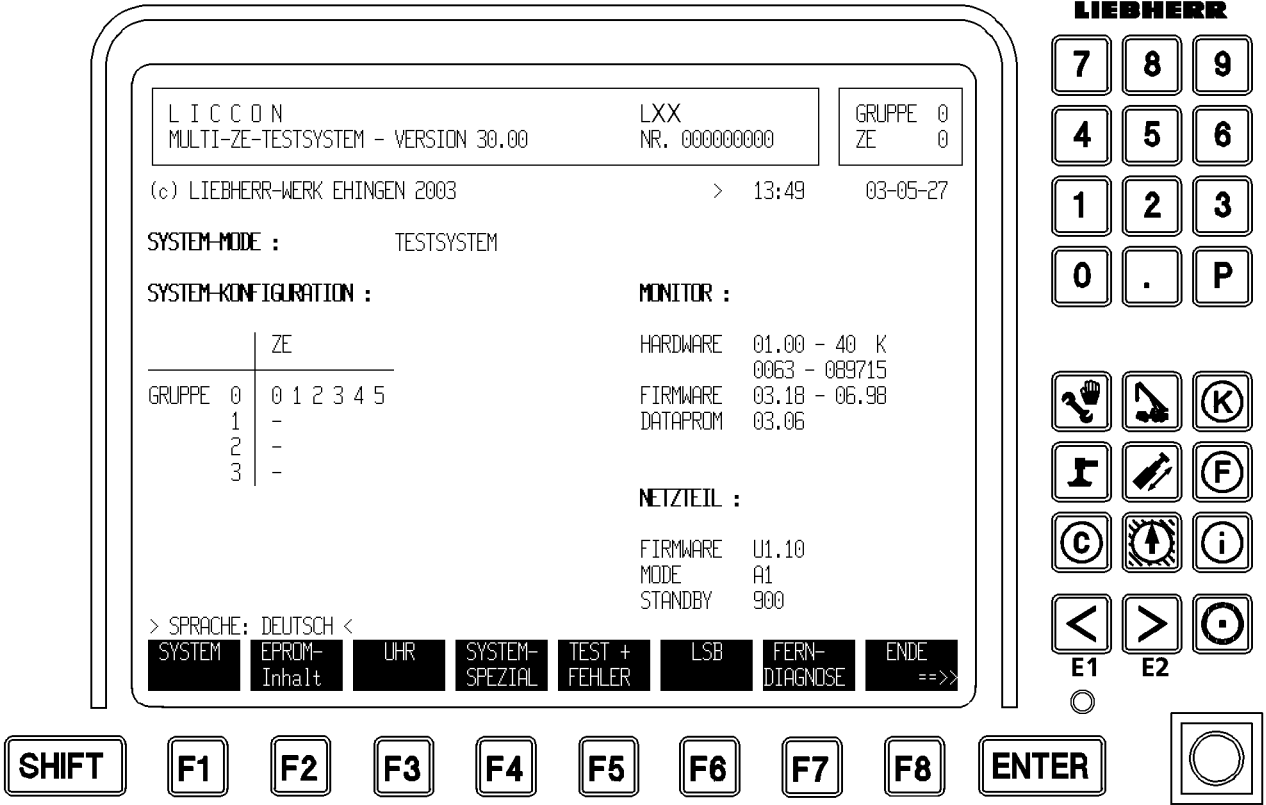
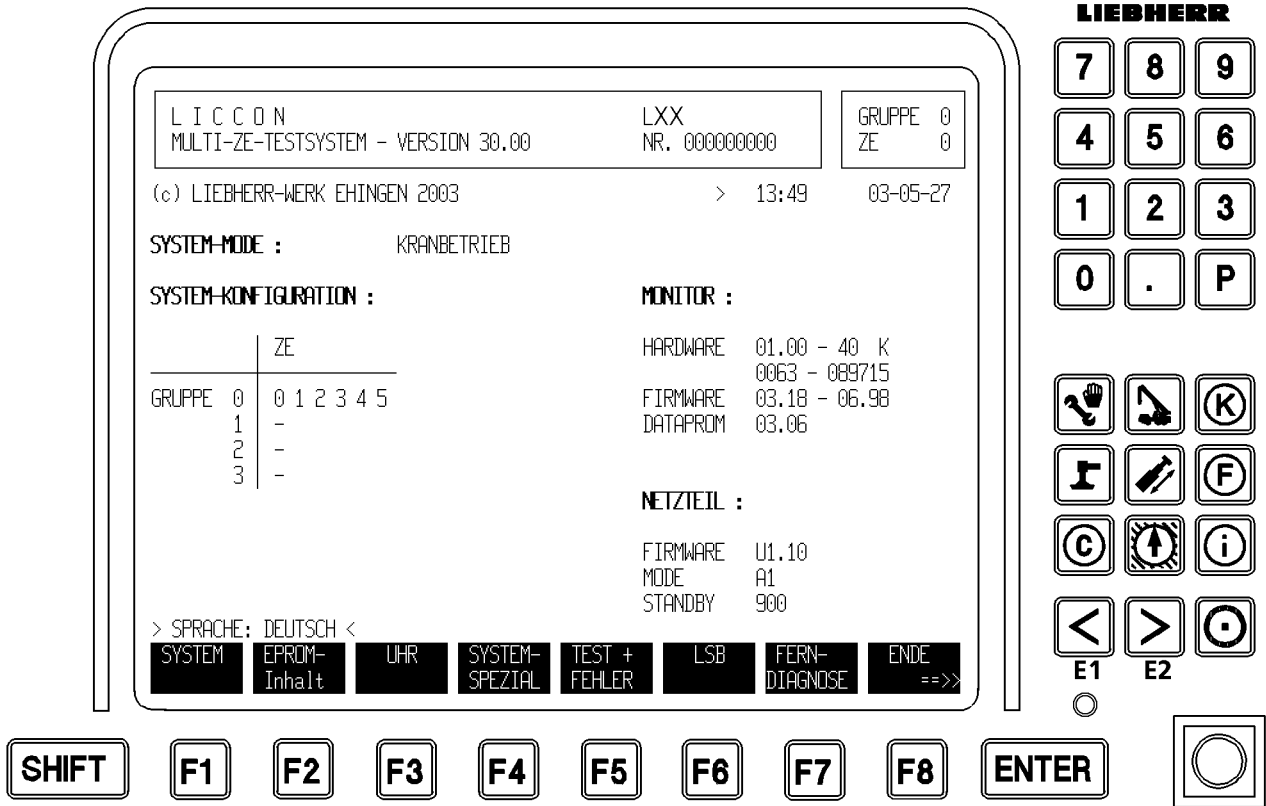
- ▶ Press function key **F5**.

#### Result:

- The date and time of storage appears in the header: **MEMORY:** 98-09-03 14:13

#### Function key line

see "Error memories" in section "LICCON error determination"



## 1.8 Procedure for LSB sensor programming

LSB sensor programming does not require use-authorization via a code.

For reasons of safety, LSB sensor programming can only be activated in the system mode TEST SYSTEM.

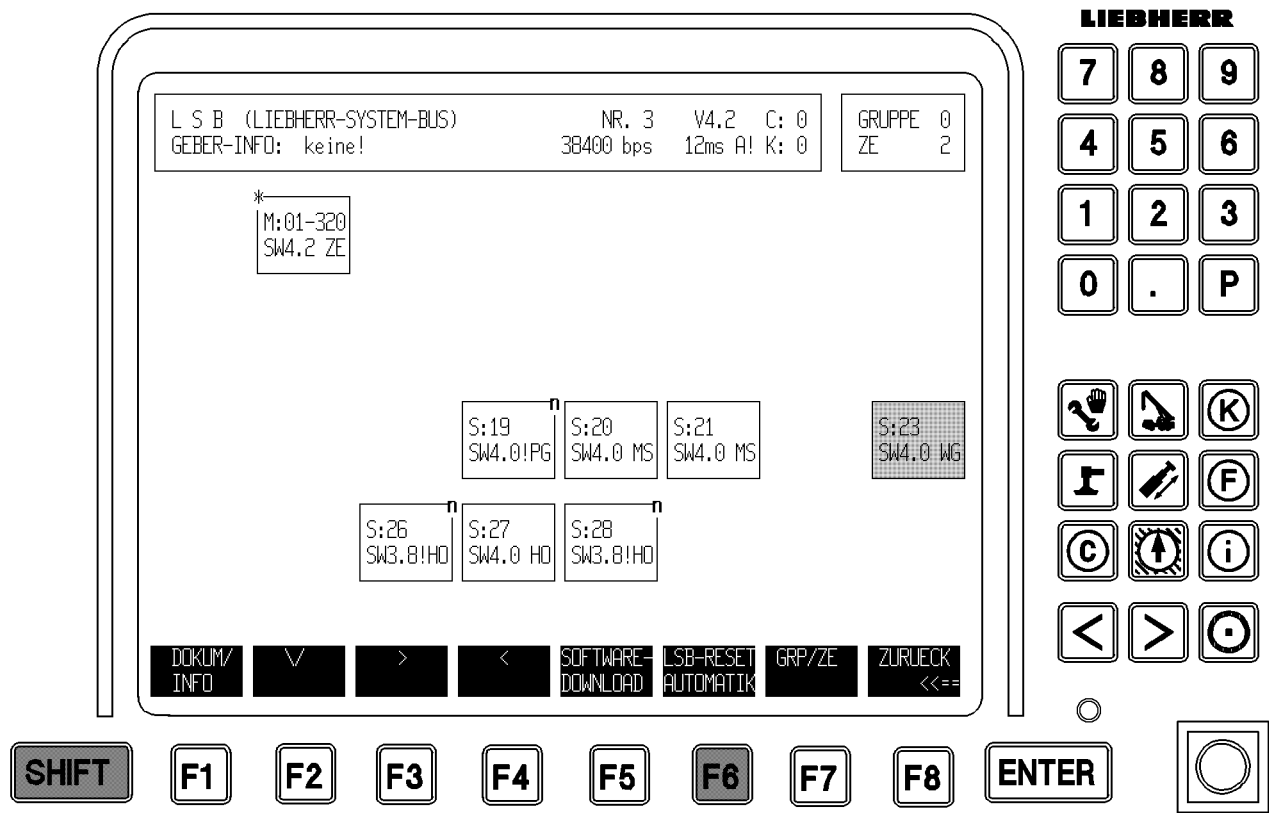
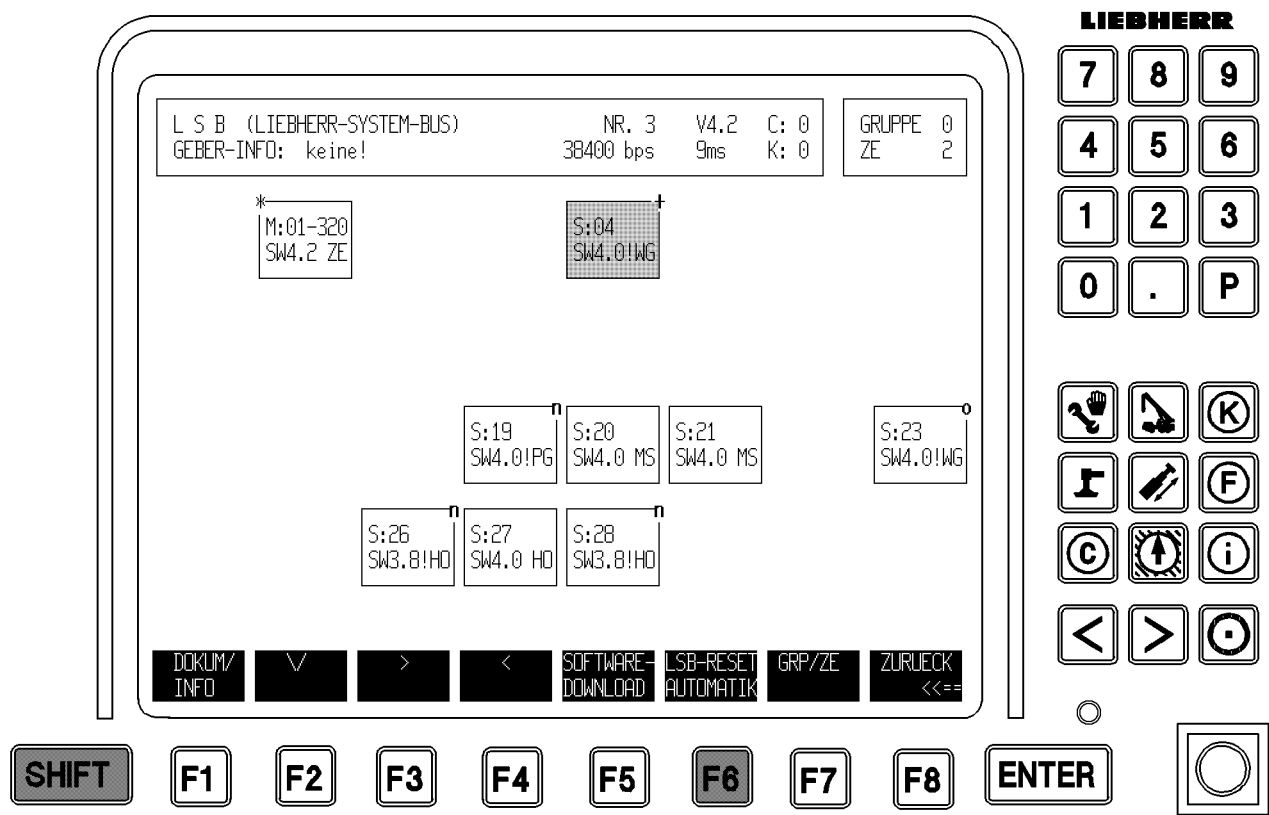
A uniquely identifiable sensor possesses the following characteristics:

- the address of the sensor on the relevant LIEBHERR system bus is not yet available
- the sensor possesses a unique type identifier

Two procedures are possible:

- 1.) Automatically assigning a uniquely identifiable sensor
- 2.) Assigning **not** uniquely identifiable sensors semi-automatically

Ensure that the LICCON computer system is started in system mode "TEST SYSTEM" (see section "Starting the Multi-CPU test system", "System mode TEST SYSTEM").



B194973

### 1.8.1 Automatically assigning a uniquely identifiable sensor

Example: Angle sensor with incorrect, but not allocated address



#### Note

Install the sensor!

- ▶ Only install and subsequently assign one sensor on the LSB bus.
- ▶ Note possible bus conflicts.

- 
- ▶ Install the sensor.
  - ▶ Press function key **F6**.

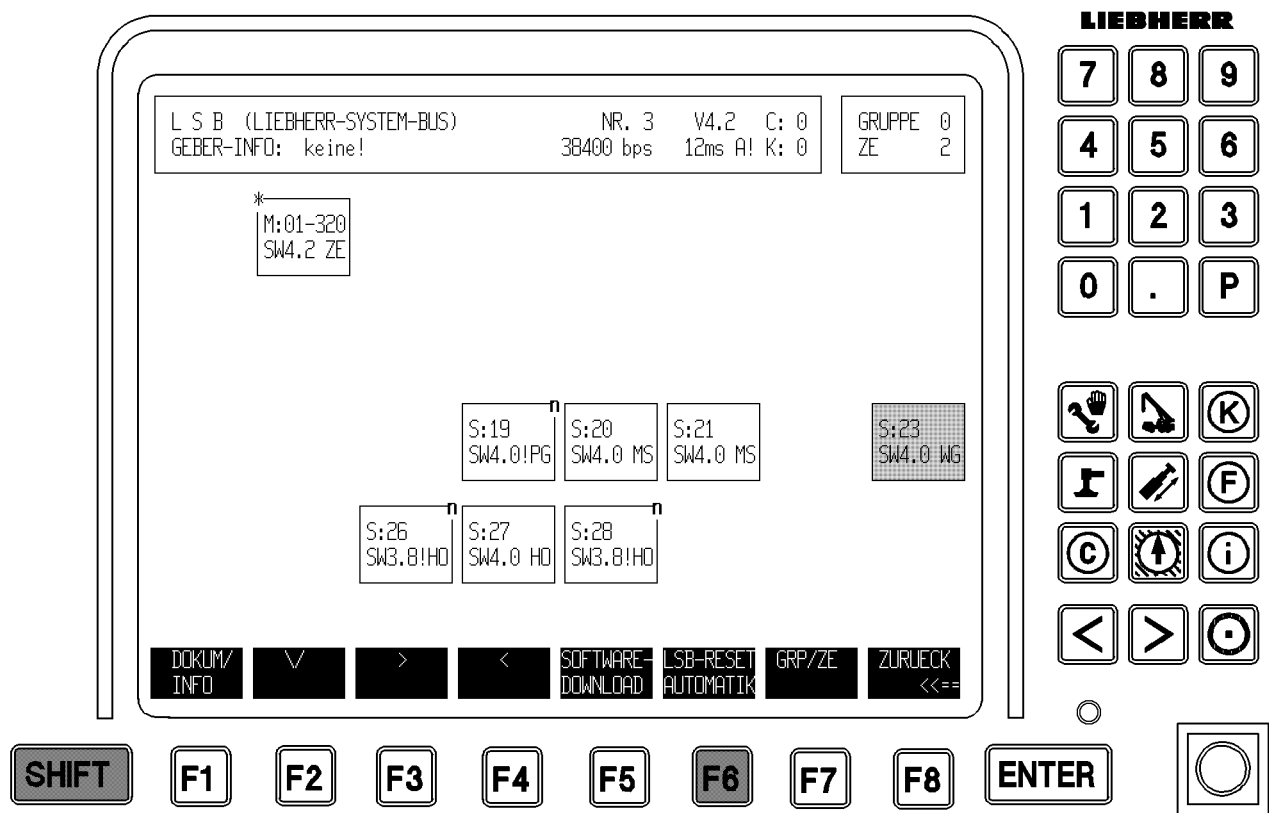
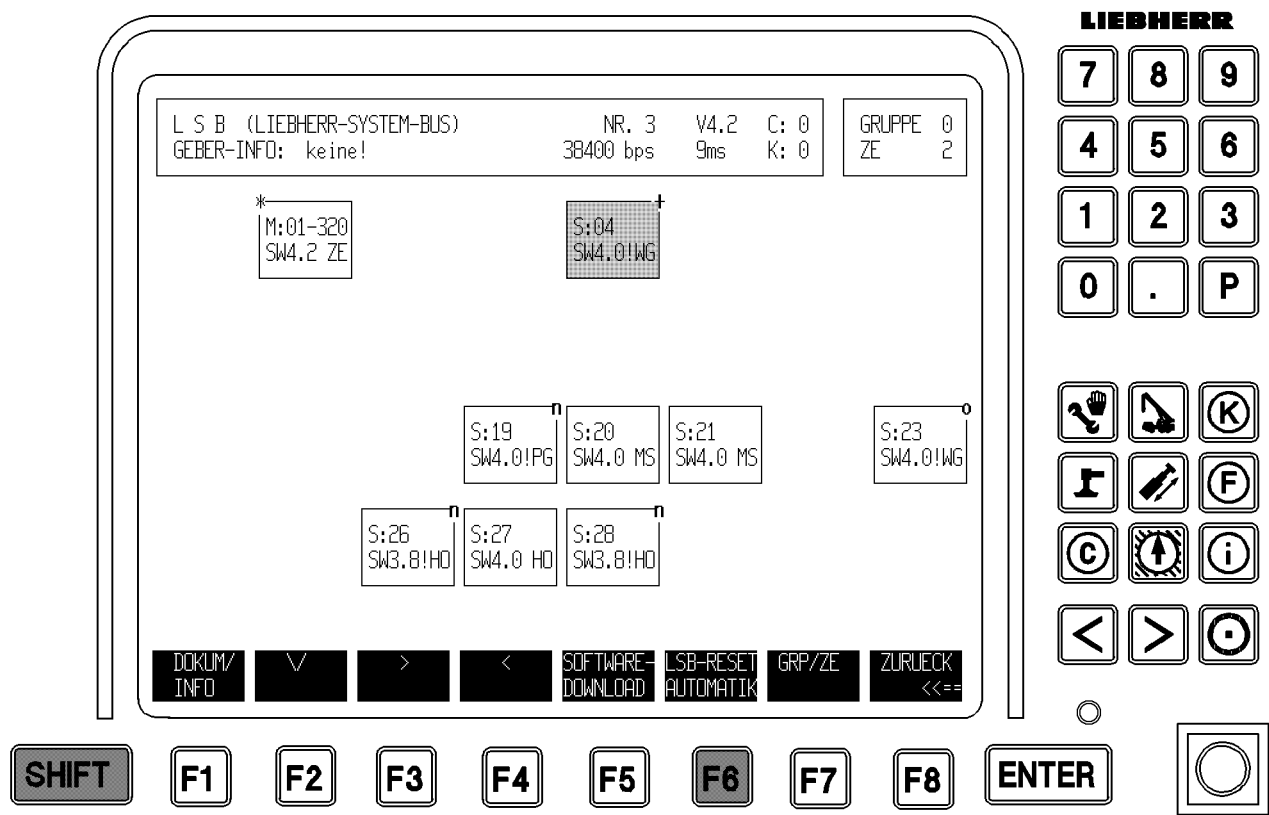
#### Result:

- “LSB overview screen” appears.
- Sensor appears with the mark “+”.

- ▶ Press keys **SHIFT + F6** (AUTOMATIC).

#### Result:

- Automatic assignment is started and will be displayed by “A!” in the header of the LSB overview screen.
- The assignment is only related to this LIEBHERR system bus.
- All sensors which are already in their predefined places will be tested. If necessary, they will be assigned default values (predefined values).
- All sensors which can uniquely be assigned to a bus phase will be programmed at their predefined address. They will automatically be assigned default values. Assignment occurs by means of the type identifier which each sensor possesses.
- The automatic system can only identify a sensor by means of the type identifier. It is therefore possible that two identical sensor types are interchanged in terms of their function (for example a length sensor with an angle sensor).
  - There are 2 possibilities for interchanging two sensors:
  - Conventional procedure: Isolate programming functions via LICCON-Error-Code and manual address allocation with automatic system switched off
  - Connect sensor via automatic system to a different LSB at address 0
- The master switch (MS) and pedal sensor (PG) are exceptions. By means of external circuit elements in the connection plug, these sensor types provide additional information which is used during identification and automatic allocation to the correct address. If the coding in the plug is different on all master switches and pedal sensors, these sensors can be uniquely assigned, even if several identical sensor types exist on one LIEBHERR system bus.



- ▶ Press keys **SHIFT + F6** (AUTOMATIC).

**Result:**

- Automatic assignment is completed.

**Note**

Switching over from system mode “TEST SYSTEM” to system mode “CRANE OPERATION”. For safety reasons, switching over is **not** possible.

- ▶ Stop and restart the LICCON computer system (see section “Starting the Multi-CPU test system”, “System mode Crane operation”).

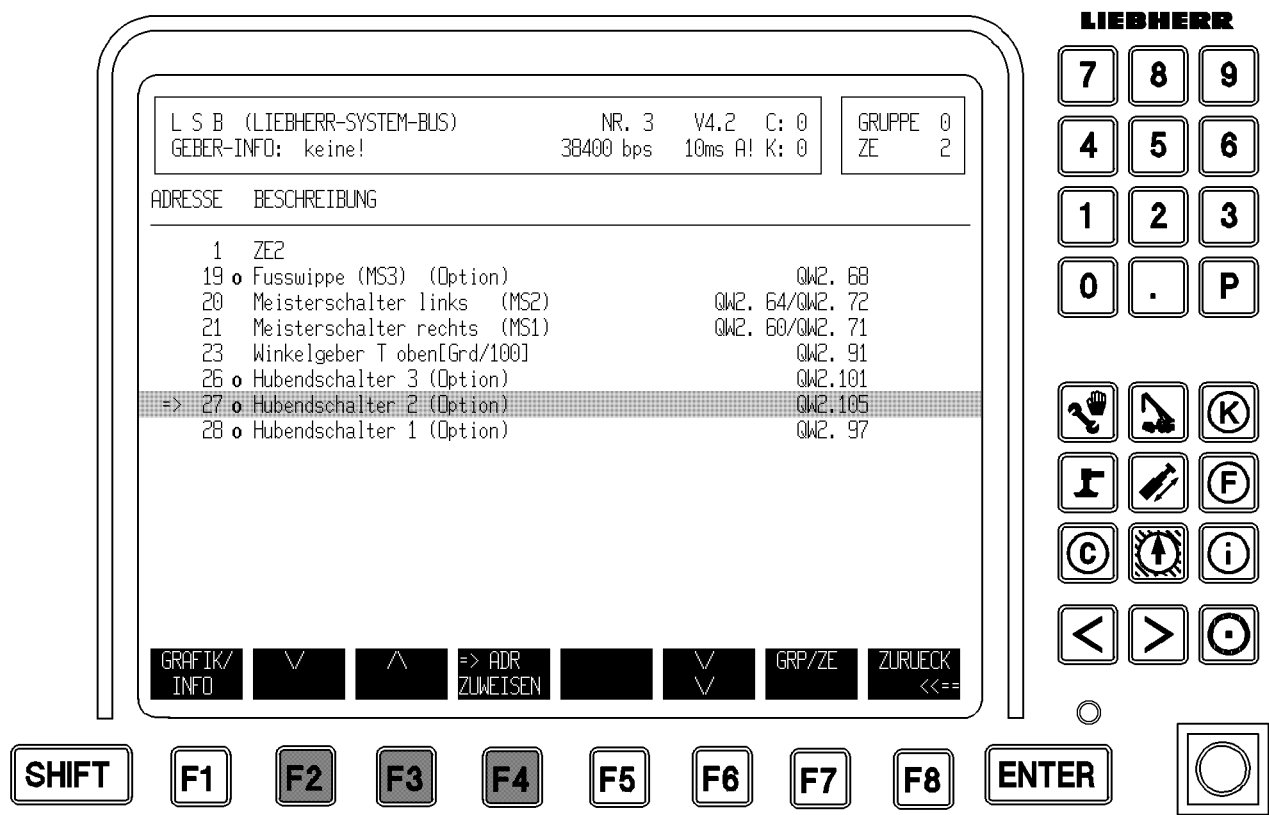
- ▶ Restart the LICCON computer system in system mode “CRANE OPERATION”.

**Troubleshooting**

Sensor cannot be assigned using automatic assignment and is allocated address 0?

Example: Hoist limit switch with incorrect, but not allocated address. Sensors which cannot be assigned uniquely are assigned the address 0. If address 0 has already been filled by another sensor the next free (not configured) position will be selected. As soon as address 0 is free, the automatic system ensures that the next sensor which cannot be assigned is allocated address 0.

- ▶ To assign sensors from address 0 using semi-automatic assignment, see the section “Assigning not uniquely identifiable sensors semi-automatically”.





### 1.8.2 Assigning not uniquely identifiable sensors semi-automatically

Example: Hoist limit switch

- Automatic assignment is started as previously described and will be displayed by “A!” in header of the LSB overview screen.
- Sensor cannot be assigned using automatic assignment and appears at address 0 in the LSB overview screen.

► Press function key **F6**.

**Result:**

- “LSB overview screen” appears.

► Press function key **F1**.

**Result:**

- View changes to documentation representation of the LSB overview.

► Press function key **F2** or function key **F3**.

**Result:**

- Place selection pointer on the target station. The possible free target stations are marked with an “o”.

► Press function key **F4**.

**Result:**

- Sensor will be assigned to the target location from address 0 and address 0 will be free again.
- Automatic assignment continues as described previously. The newly assigned station will be tested automatically and given default values. The next sensor that cannot be assigned will be assigned to address 0 by the automatic system and can therefore be assigned semi-automatically.

---

#### Troubleshooting

“A!” does not appear in the header of the LSB overview and automatic assignment is therefore not active?

It is possible that the automatic system is not active during semi-automatic assignment.

- Assign default values manually in this case. (see section “LSB detail display slave”, “Hoist limit switch with wind sensor”, “Function key line”)
- 

- If all sensors are assigned (automatically and semi-automatically):  
Press keys **SHIFT + F6** (AUTOMATIC).

**Result:**

- Automatic assignment is completed.
- 

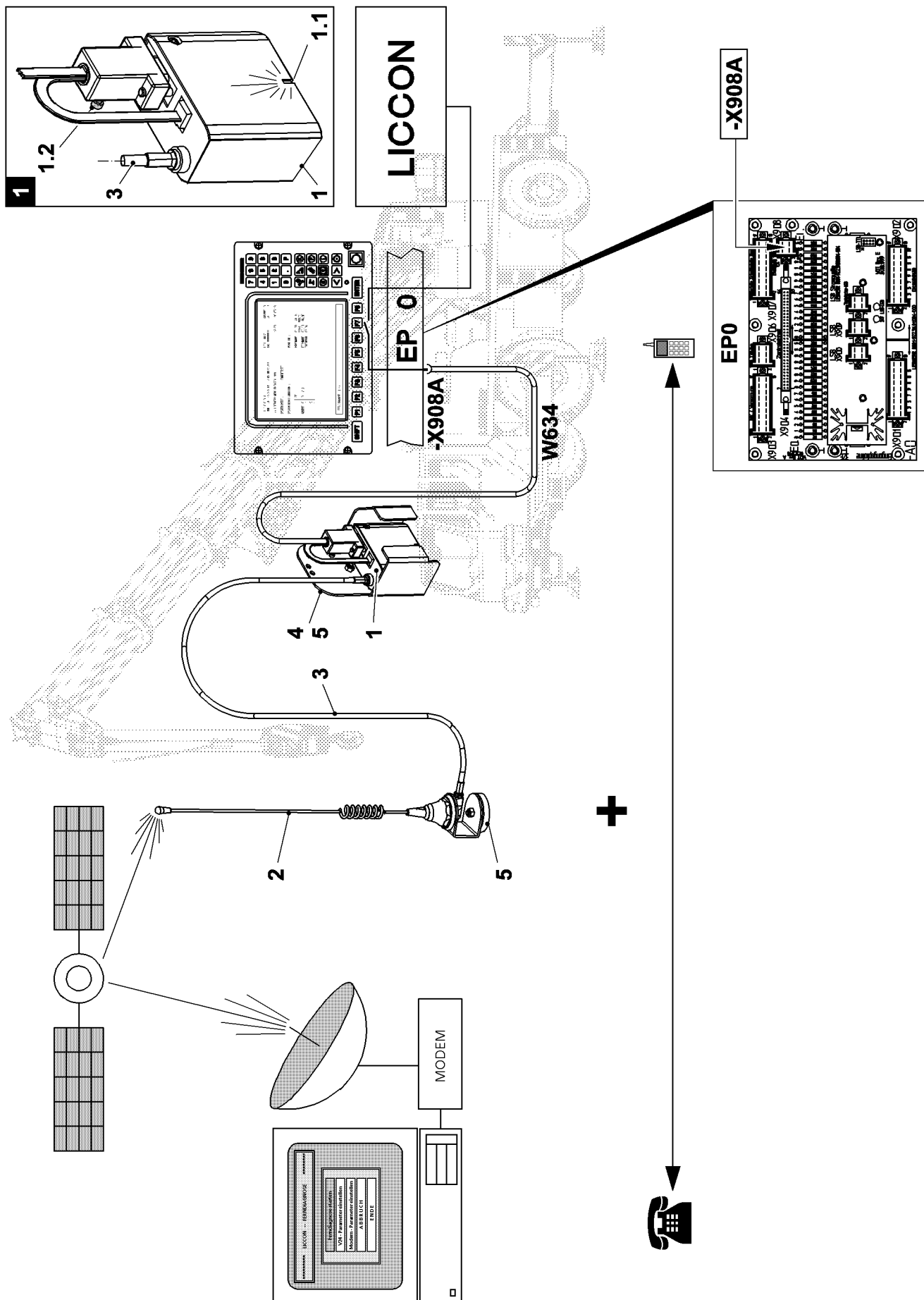


#### Note

Switching over from system mode “TEST SYSTEM” to system mode “CRANE OPERATION”. For safety reasons, switching over is **not** possible.

- Stop and restart the LICCON computer system (see section “Starting the Multi-CPU test system”, “System mode Crane operation”).
- 

- Restart the LICCON computer system in system mode “CRANE OPERATION”.
-



B194976

# 1 Remote diagnostics\*



## Note

► Remote diagnostics is not available for all crane models!

LWE remote diagnostics allows LIEBHERR cranes to be serviced remotely in the event of an error. The remote diagnostics module must be linked to the LICCON computer system of the crane.

From here, data can be read off the LICCON computer system via the Multi-CPU test system and transferred to the LIEBHERR customer service computer or to a LIEBHERR service point.

A connection must also be made with LIEBHERR customer service or a LIEBHERR service point by mobile telephone.

Always ensure that the instructions given by the LIEBHERR customer service or LIEBHERR service point are followed precisely.

## 1.1 LWE remote diagnostics module

1 GSM module

• The SIM-card is **not** provided together with the remote diagnostics module.

1.1 Status LED

1.2 "Reset" key

2 Radio antenna

3 Antenna cable

4 Bracket

5 Permanent magnet

## 1.2 Activating the remote diagnostic module / remote diagnostics device

Before the remote diagnostics can be carried out, certain preconditions have to be fulfilled to ensure trouble-free execution of the remote diagnostics / connection to the GSM module.

Activation of the remote diagnostics device is first carried out by LIEBHERR customer service.



## Note

Deactivate the PIN code request of the SIM-card!

A standard cell phone is required to deactivate the PIN-code request of the SIM-card!

► Insert the SIM-card into this cell phone and switch off or deactivate the PIN code request!

► The SIM-card is not provided together with the remote diagnostics module!

Ensure that

- A valid SIM-card (telephone card for mobile telephones) of an established cell phone network provider is available.
- The SIM-card from the cell phone network provider is released for CSD-service (**C**ircuit **S**witched **D**ata).
- The telephone number of the data service is known.
- The PIN code request of the SIM-card is deactivated.
- The SIM-card is installed in the GSM module.

The SIM-card offers three different telephone services, each of which has its own telephone number:

- Voice
- Fax
- **Data**

► Insert the 4-pin cable connector **-X908** of the connection cable **W634** from the LWE remote diagnostics module into the interface on the input PCB 0 **EP0**.

## Result:

- The GSM module is now linked via this interface on the IPCB0 with the LICCON.

Have the following control parameters entered on the LICCON **only by LIEBHERR customer service!**

- ▶ One-time entry of control parameters "CW.6.115=-1" and "CW.6.116=-1" by LIEBHERR customer service.

Once the entry of the control parameters has been successfully carried out, the following steps must be taken to make the connection.

<b>Telephone number data service of the crane operator:</b>	<div style="border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <p>(please enter telephone number here)</p>
---	---

- ▶ Call by mobile telephone to the appropriate LIEBHERR customer service point (CS-point) and give the telephone number of the data service to the customer service employee.



#### Note

Transferral of information

- ▶ Only text functions, i.e. only information from the system mode "TEST SYSTEM" will be transferred by radio.

- ▶ Start the superstructure engine and press program key **P8** ("i" -key) to change to the program "Multi-CPU test system".
- ▶ The CS point calls the "crane" using the telephone number of the data service. The connection is visible to the crane operator by the flickering of the status LED **1.1** on the GSM module **1**.
- ▶ If the LIEBHERR customer service employee asks over the phone for this to be done:  
Start remote diagnostics: Press function key **F7** on the LICCON monitor.

#### Result:

- The data from the CPU0 will be transferred via the console computer to the remote diagnostics module.

blank page!

2

L I C C O N  
MULTI-ZE-TESTSYSTEM - VERSION 30.00

LX  
NR. 000000000

GRUPPE 0  
ZE 0

(c) LIEBHERR-WERK EHINGEN 2003 > 13:49 03-05-27

SYSTEM-MODE : KRANBETRIEB

SYSTEM-KONFIGURATION :

	ZE
GRUPPE 0	0 1 2 3 4 5
1	-
2	-
3	-

MONITOR :  
HARDWARE 01.00 - 40 K  
0063 - 089715  
FIRMWARE 03.18 - 06.98  
DATAPROM 03.06

NETZTEIL :  
FIRMWARE U1.10  
MODE A1  
STANDBY 900

SYSTEM

EPROM-Inhalt

UHR

SYSTEM-SPEZIAL

TEST + FEHLER

LSB

FERN-DIAGNOSE

ENDE ==>>

LIEBHERR

789

456

123

0.P

P8

E1E2

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER

3

L I C C O N  
MULTI-ZE-TESTSYSTEM - VERSION 30.00

LX  
NR. 000000000

GRUPPE 0  
ZE 0

(c) LIEBHERR-WERK EHINGEN 2003 > 13:49 03-05-27

SYSTEM-MODE : TESTSYSTEM

SYSTEM-KONFIGURATION :

	ZE
GRUPPE 0	0 1 2 3 4 5
1	-
2	-
3	-

MONITOR :  
HARDWARE 01.00 - 40 K  
0063 - 089715  
FIRMWARE 03.18 - 06.98  
DATAPROM 03.06

NETZTEIL :  
FIRMWARE U1.10  
MODE A1  
STANDBY 900

FERNDIAGNOSE !!! =>

LIEBHERR

789

456

123

0.P

E1E2

SHIFT

F1

F2

F3

F4

F5

F6

F7

F8

ENTER

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166

LIEBHERR

20.15

## 1.3 Carrying out a remote diagnostics

As soon as the remote diagnostics has been started by the crane driver, the initialization display of the Multi-CPU test system (see illustration 3) will be “frozen” on the crane's LICCON monitor.

The LIEBHERR customer service employee can now service the LICCON test system via the connection from his PC to the remote diagnostics module.



---

### **DANGER**

Increased danger of accidents!

Despite the frozen screen, the crane driver is still able to drive all crane functions **without** the operating screen. Single exception: “Automatic telescoping mode”.

- ▶ Execute all crane movements with the utmost care, lowest possible acceleration and minimum speed.
  - ▶ Ensure that the telephone contact with the LIEBHERR customer service employee is maintained continually.
  - ▶ Follow all instructions given by the customer service employee.
- 

### 1.3.1 Identifying errors

The remote diagnostics system can only identify static, electrical errors which are sampled at time periods longer than 2 seconds.

- ▶ If an error only appears sporadically when working with the crane:  
Leave the crane turned on.

#### **Result:**

- LIEBHERR customer service can call the crane using the remote diagnosis system in order to locate the error.

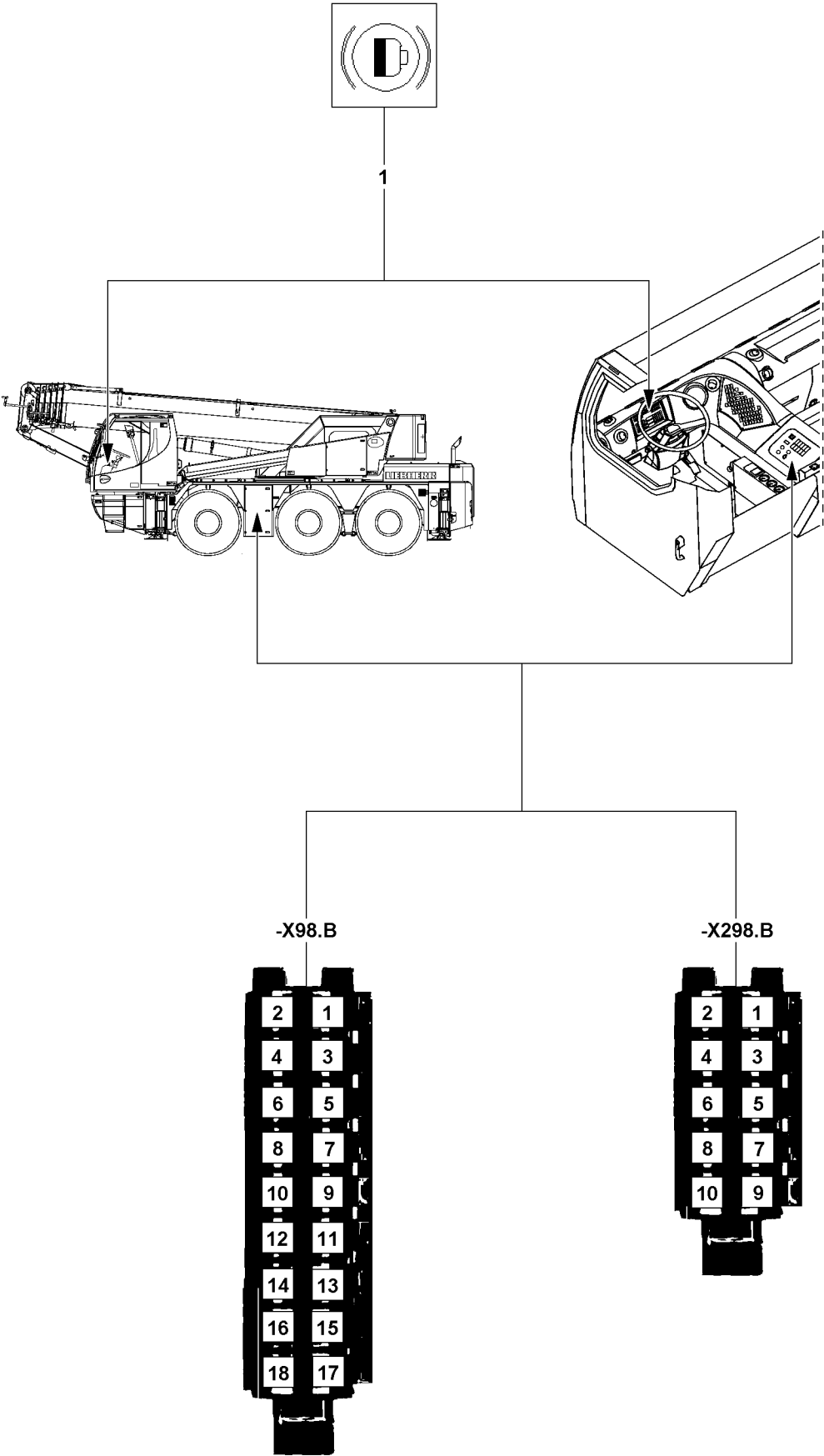
---

#### **Troubleshooting**

No data connection to the crane can be made?

The data connection has failed. The GSM module will have to be reinitialized and the data connection reestablished for remote diagnostics.

- ▶ Only if advised specifically to do so by the LIEBHERR customer service employee: Press the key “Reset” 1.2 on the GSM module.
-



B114182



# 1 The diagnostics - disk brake pads



## Note

► Applies only for cranes with disk brakes.

If the warning light **1** on the display unit lights up, it is a sign that at least one brake pad has reached the wear limit.

## NOTICE

Property damage!

If work on the electrical system of the crane is carried out without the required special expertise, then the electrical system of the crane can be damaged.

► Work on the electrical system of the crane may only be carried out by trained electrical specialists.

## 1.1 Preparing for the diagnostics for the disk brake pads

- Cranes with up to seven axles have only diagnostics plug **-X98.B**
- Cranes from eight axles on additionally are equipped with diagnostics plug **-X298.B**

Via the diagnostics plug in the center console (only LTC: switch cabinet chassis), worn brake pads can be localized.

Make sure that the following prerequisites are met:

- Diagnostics plug **-X98.B** and - if applicable - diagnostics plug **-X298.B** are freely accessible
- A voltage meter for 24 V is available

Diagnostics plug <b>-X98.B</b>			
Configuration	Pin		Configuration
Brake pad sound	2	1	Supply
Brake pads axle 1 right	4	3	Brake pads axle 1, left
Brake pads axle 2 right	6	5	Brake pads axle 2, left
Brake pads axle 3 right <sup>1</sup>	8	7	Brake pads axle 3 left <sup>1</sup>
Brake pads axle 4 right <sup>1</sup>	10	9	Brake pads axle 4 left <sup>1</sup>
Brake pads axle 5 right <sup>1</sup>	12	11	Brake pads axle 5 left <sup>1</sup>
Brake pads axle 6 right <sup>1</sup>	14	13	Brake pads axle 6 left <sup>1</sup>
Brake pads axle 7 right <sup>1</sup>	16	15	Brake pads axle 7 left <sup>1</sup>
Ground	18	17	-

<sup>1</sup> If axle is present

Diagnostics plug <b>-X298.B</b>			
Configuration	Pin		Configuration
Brake pads axle 8 right <sup>1</sup>	2	1	Brake pads axle 8 left <sup>1</sup>
Brake pads axle 9 right <sup>1</sup>	4	3	Brake pads axle 9 left <sup>1</sup>
-	6	5	-

Diagnostics plug -X298.B			
-	8	7	-
-	10	9	-

<sup>1</sup> If axle is present

## 1.2 Diagnostics - disk brake pads: Comparison measurement of control voltage

The control voltage for “Diagnostics - disk brake pads” is listed in the supplied electrical circuit diagram of the crane.

The control voltage must be checked via a comparison measurement on the diagnostics plug **-X98.B**.

- ▶ Carry out a comparison measurement: On the diagnostics plug **-X98.B** measure the pin **18** against pin **1**.

### Troubleshooting

The measured value of the control voltage deviates from the data in the supplied electrical circuit diagram of the crane.

- ▶ An fault is present. Localize the fault or contact Liebherr Service.

## 1.3 Diagnostics - disk brake pads: Sequence for measurement

For diagnostics of the disk brake pads, the pins of all axles are measured against pin **18** ( diagnostics plug **-X98.B**: ground).

The following sequence must be adhered to: The measurement starts for “pads axle 1 left”, then “pads axle 1 right”, then “pads axle 2 left”, then “pads axle 2 right” and so on, if applicable.

Cranes from 8 axles: The pins of axles 8 and axle 9 ( diagnostics plug **-X298.B**) must also be measured against pin **18** ( diagnostics plug **-X98.B**: ground).

## 1.4 Carrying out the diagnostics for the disk brake pads



### Note

- ▶ Carry out the diagnostics for each brake pad individually.
- ▶ The current determined with the multimeter provides information if the inspected brake pad is OK or if the brake pad is worn, or an electrical problem is present in the diagnostics circuit.
- ▶ During the diagnostics of the disk brake pads, always check all brake pads.

Make sure that the following prerequisites are met:

- Warning light **1** on the display unit lights up
- the comparison measurement of the control voltage was carried out

The diagnostics must be continued in the specified sequence until a fault (worn brake pads) is found. If a fault (worn brake pads) is determined, then it must be remedied first (replace brake pads). If the warning light **1** continues to light up, then the diagnostics must be repeated and continued.

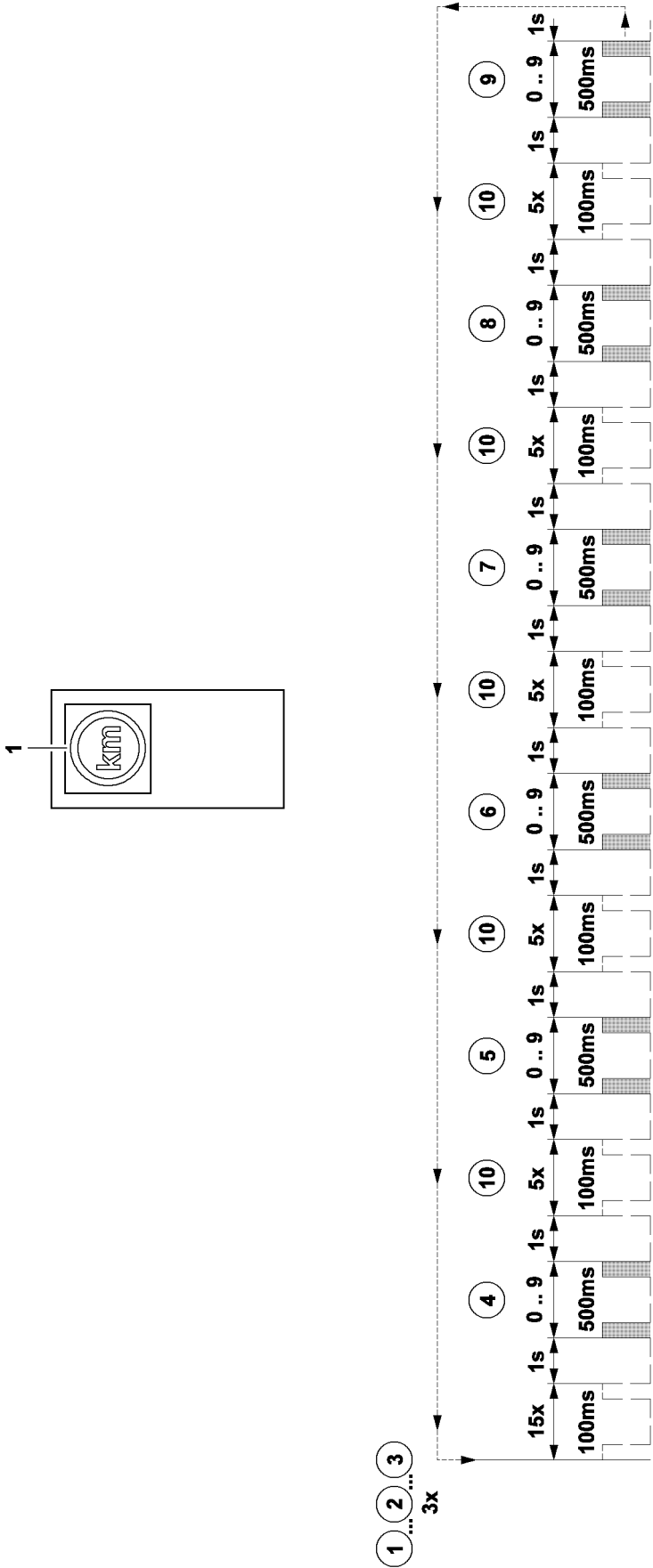
- ▶ Axle 1 left, diagnostics plug **-X98.B**: Measure the voltage between pin **3** and pin **18** and compare with the control voltage.
- ▶ Axle 1 right, diagnostics plug **-X98.B**: Measure the voltage between pin **4** and pin **18** and compare with the control voltage.
- ▶ Axle 2 left, diagnostics plug **-X98.B**: Measure the voltage between pin **5** and pin **18** and compare with the control voltage.
- ▶ Axle 2 right, diagnostics plug **-X98.B**: Measure the voltage between pin **6** and pin **18** and compare with the control voltage.

**Note**

- ▶ The respective pins are only assigned if the crane is equipped with the respective axle.
- 
- ▶ Depending on the number of axles additionally:
    - Axle 3 left, diagnostics plug **-X98.B**: Measure the voltage between pin **7** and pin **18** and compare with the control voltage.
    - Axle 3 right, diagnostics plug **-X98.B**: Measure the voltage between pin **8** and pin **18** and compare with the control voltage.
    - Axle 4 left, diagnostics plug **-X98.B**: Measure the voltage between pin **9** and pin **18** and compare with the control voltage.
    - Axle 4 right, diagnostics plug **-X98.B**: Measure the voltage between pin **10** and pin **18** and compare with the control voltage.
    - Axle 5 left, diagnostics plug **-X98.B**: Measure the voltage between pin **11** and pin **18** and compare with the control voltage.
    - Axle 5 right, diagnostics plug **-X98.B**: Measure the voltage between pin **12** and pin **18** and compare with the control voltage.
    - Axle 6 left, diagnostics plug **-X98.B**: Measure the voltage between pin **13** and pin **18** and compare with the control voltage.
    - Axle 6 right, diagnostics plug **-X98.B**: Measure the voltage between pin **14** and pin **18** and compare with the control voltage.
    - Axle 7 left, diagnostics plug **-X98.B**: Measure the voltage between pin **15** and pin **18** and compare with the control voltage.
    - Axle 7 right, diagnostics plug **-X98.B**: Measure the voltage between pin **16** and pin **18** and compare with the control voltage.

**Note**

- ▶ Diagnostics plug **-X298.B** is only present if the crane is equipped with at least 8 axles.
- 
- ▶ Axle 8, left: Measure the voltage between pin **1** on diagnostics plug **-X298.B**) and pin **18** on diagnostics plug **-X98.B** and compare with the control voltage.
  - ▶ Axle 8 right: Measure the voltage between pin **2** on diagnostics plug **-X298.B**) and pin **18** on diagnostics plug **-X98.B** and compare with the control voltage.
  - ▶ Axle 9, left: Measure the voltage between pin **3** on diagnostics plug **-X298.B**) and pin **18** on diagnostics plug **-X98.B** and compare with the control voltage.
  - ▶ Axle 9 right: Measure the voltage between pin **4** on diagnostics plug **-X298.B**) and pin **18** on diagnostics plug **-X98.B** and compare with the control voltage.



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# 1 Trailing axle diagnostics\*



## DANGER

Danger of accident!

- ▶ If an error occurs on the trailing axle during the driving mode - recognizable by the blinking control light **1** in the center console - then - for safety reasons - travel must be stopped immediately, see chapter 6.09 **Section** "Driving the crane".

In case of an error on the trailing axle, after turning on the ignition, a blinker code is issued on the control light **1** and at the same time, the buzzer sounds **three times** (3x) .



## Note

- ▶ The blinker code is evaluated according to the illustration on the opposite page.
- ▶ If several errors are present at the same time, then they are shown by a blinker code, one after the other, via the control light **1**.
- ▶ All issued errors are repeated until the ignition is turned off and the error (s) is / are remedied.
- ▶ As a matter of principle, all errors, which are issued on the control light **1**, must be evaluated.



## DANGER

Danger of accident!

- ▶ Any errors which occur on the trailing axle must be remedied before starting to drive.
- ▶ Driving the crane with active errors on the trailing axle is **explicitly prohibited!**

The evaluated blinker code corresponds to the LICCON Error Code (LEC), see chapter 20.05.

## 1.1 Configuration of the blinker code /LICCON Error Codes

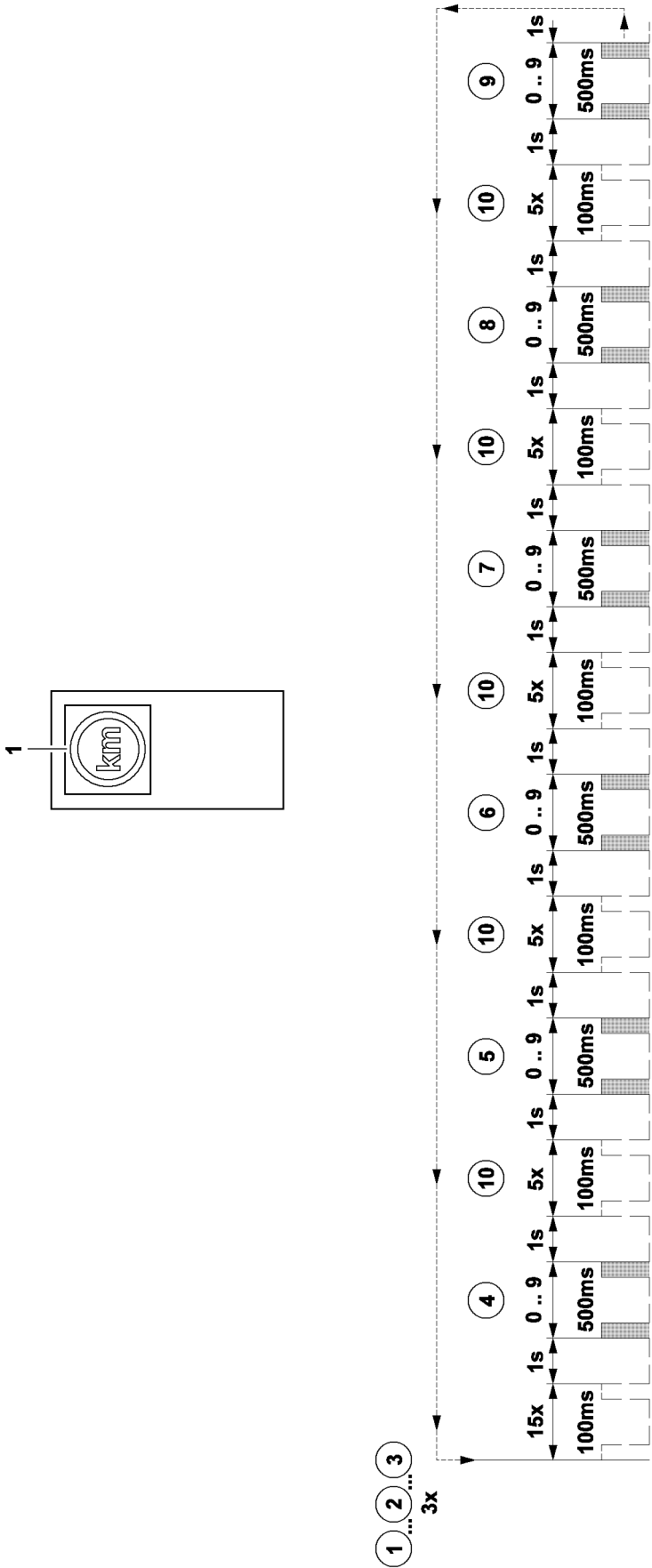


## Note

- ▶ The LICCON Error Code (LEC) issued via the control light **1** is a straight number code and is equated to the error classification "**System error**" .

The LICCON Error Code (LEC) is combined of device (**1st and 2nd number** of the LEC), error path (**3rd and 4th number** of the LEC) and type of error (**5th and 6th number** of the LEC), see chapter 20.05.

LICCON Error Code (example): 3 9 4 2 1 5						
Description	Device		Error			
			path		type	
	10	1	10	1	10	1
	3	9	4	2	1	5
LEC	39		42		15	



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## 1.2 Evaluating the blinker code



### Note

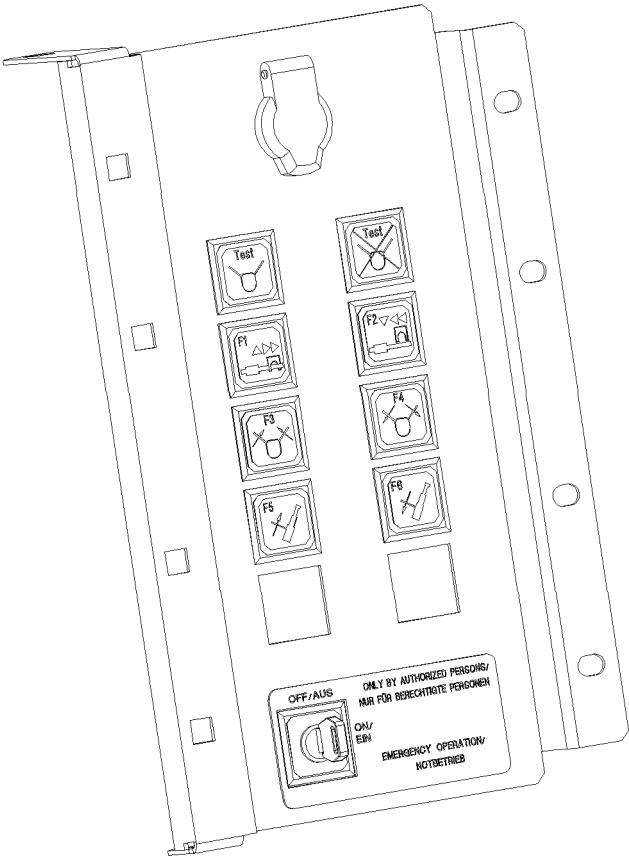
- For points 4-9 of the blinker code - see opposite illustration - the corresponding numbers of the LEC are issued by the number of repeat blinks.

	Description	Device		Error			
		(repeat blinks)		(repeat blinks)		(repeat blinks)	
		10	1	path	10	1	type
①	Ignition "ON"						
②	Buzzer sounds (in case of error) <b>three times</b> (3x)						
③	<b>START</b> , next error or repetition						
④	(1st position LEC)	0 .. 9 (3x)					
⑤	(2nd position LEC)						
⑥	(3rd position LEC)						
⑦	(4th position LEC)						
⑧	(5th position LEC)						
⑨	(6th position LEC)						
⑩	Pause 5 x 100 ms						
LEC		3	9	4	2	1	5



### Note

- By stating the evaluated LEC (example: **3 9 4 2 1 5**) and the corresponding type number of the trailing axle, LIEBHERR Service can specify the cause of the error and provide tips for error remedy.



B195426



# 1 Test system, TY-guying\*

With this crane, it is **not** possible to operate and observe the operating interface and the test system simultaneously.

Because of this, an option has been created to use the TY test system for remote diagnostics.



---

## **DANGER**

Risk of accident!

It is strictly forbidden for the crane operator and crane personnel to operate the TY test system and use it for diagnostic purposes.

- The TY test system may only be operated and used for error diagnostics by authorized specialist personnel (LIEBHERR customer service).
-



---

## 90 Appendix



# 1 Preface

This crane may only be used in flawless technical condition and according to its mission as well as with constant awareness of safety and dangers. Any problems, which could affect safety must be fixed immediately.



## Note

- Modifications on the crane may only be made with written approval by Liebherr-Werk Ehingen GmbH.

## 1.1 Changes and updates for Operating instructions

Changes and updates for Operating instructions, which you receive in the circular as Customer information, must be filed in the Operating instructions for the respective crane under chapter 90.05.



## Note

Procedure after receiving customer information!

- Attach the decals **1**, which are enclosed in the customer information to the footer of the respective chapter. See following example.
- Fill out the update confirmation form in chapter 90.05 of the operating instructions,
- Insert changes and updates under chapter 90.05 of the operating instructions.



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## Example:

A change or update affects the Crane operating instructions, chapter 2.04.

- Attach the decal **1** in the footer of chapter 2.04.



## 1 Update confirmation

[illegible]

## 2 Customer information





# Index

## 2

20 Diagnostics **13**

## 9

90 Appendix **179**

## A

Activating the remote diagnostic module / remote diagnos **163**

Application errors **74**

## B

Basic module errors **37**

## C

Carrying out a remote diagnostics **167**

Carrying out the diagnostics for the disk brake pads **170**

Changes and updates for Operating instructions **181**

Changing the language in the BTT test system **101**

Changing the time of day / time zone / date in the BTT t **101**

Configuration of the blinker code /LICCON Error Codes **173**

Customer information **183**

## D

Decoding of LICCON-Error-Code (LEC) **90**

Diagnostics - disk brake pads: Comparison measurement of **170**

Diagnostics – disk brake pads **168**

Diagnostics - disk brake pads: Sequence for measurement **170**

Diagnostics - trailing axle **172**

## E

Error identification - LICCON computer system **17**

Error information in the BTT test system **99**

Error processing in the BTT error stack **95**

Error recognition - LICCON computer system **16**

Evaluating the blinker code **175**

## F

Foreword to appendix **180**

Functionality of the BTT error stack **91**

Function determination in the BTT test system **90**

Function keys in the BTT test system **89**

## G

General **18**

## H

Hardware error **117**

## I

Index **185**

## L

LICCON error determination **145**

LSB detail display master **127**

LSB detail display slave **133**

LSB overview **121**

LSB overview - general **119**

LWE remote diagnostics module **163**

## M

Monitor errors **29**

Multi-CPU test system **113**

## O

Operating errors **85**

Overview Bus system **14**

Overview Bus system **15**

## P

Preface **181**

Preparing for the diagnostics for the disk brake pads **169**

Problem on Bluetooth™ Terminal (BTT) **107**

Problem on the radio remote control (BTT-E) **111**

Problems on the operating elements of the BTT and radio remote control (BTT-E) **107**

Procedure for LSB sensor programming **155**

Procedure in case of error messages in the BTT error sta **93**

## R

Remote diagnostics **162**

Remote diagnostics\* **163**

## S

Settings in the BTT test system **101**

Starting the BTT test system **89**

Starting the Multi-CPU test system **113**

System errors **81**

## T

Test system Bluetooth™ Terminal (BTT) **88**

Test system BSE **112**

Test system, TY-guying **176**

Test system, TY-guying\* **177**

The BTT test system **89**

The diagnostics - disk brake pads **169**

Trailing axle diagnostics\* **173**

Transferring error messages: Crane with automatically ac **103**

Transferring error messages: Crane without automatically **105**

Transferring error messages from the BTT test system to the BSE test system **103**

## U

Update confirmation **182**

Update confirmation **183**