TEREX®

GLOBAL CRANE TRAINING

AC200-1 OPERATION

IC-1 Symbols and Screens

IC-1 Symbols and Screens Content

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IC-1 symbol and screen explanation

Safety Equipment

IC−1 crane control

The crane control **IC−1 (Intelligent Control System)** combines several devices which provide the crane driver with essential information for operating the crane within the parameters specified by the manufacturer:

- Overload cut−off device (load limit device LLD)
- Telescoping Information System
- Display of numerous crane functions, for example, support pressure, tilt, crane configuration, lifting capacities etc.
- Warning (optical and acoustic) in case of prohibited conditions.

This crane control (incl. load limit device) is an **operating aid.** It provides the crane operator with essential information concerning crane data such as length and angle of the boom, sheave head height, nominal lifting capacity, the total load suspended from the boom, etc. and gives warning when an overload condition is being approached or when the hook block gets too close to the boom head.

This safety device is no substitute for the judgment and experience of the crane operator and use of recognized safe operating procedures for the use of cranes.
The crane operator still carries the ultimate responsibility for safe operation of the crane.

Load limit device (LLD)

Function

If, when raising a load or increasing the working radius with load, the permissible load moment/the permissible load is exceeded, both the movements which increase the load moment and the movement which decreases the load moment "Raise luffing gear" and "Raise load on hook" are disabled. "Lower load on hook" is permitted.

A continuous tone sounds and the Stop symbol 

appears.

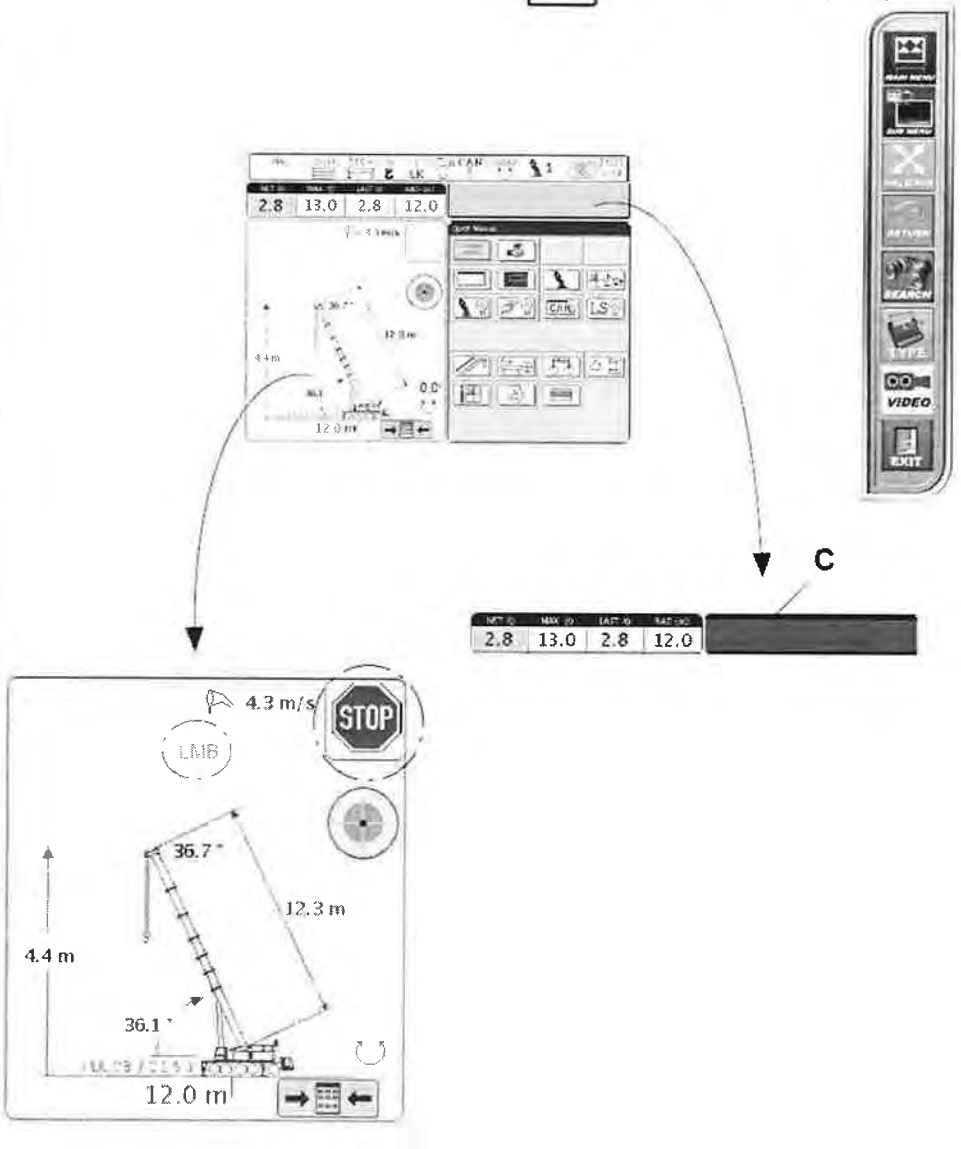
The warning message LLD appears (red). In addition, the color of the bar display (C) changes from yellow to red. Lifting of loads is not permitted!
After a shutdown by the load limit device, only movements which decrease the load moment may now be initiated.

RISK OF ACCIDENTS!
It is absolutely forbidden to override the load limit device to overload the crane above its load bearing capacity!
Lifting a load with the load limit device overridden is prohibited!

The load limit device should only be activated in an emergency situation. Under no circumstances may it be used as a standard operating tool!
This means that the crane operator must be satisfied, before hoisting the load, that the load bearing capacity of the crane is not exceeded by the load to be lifted. Loads that are too heavy and exceed the load bearing capacity of the crane must not be accepted, even if there is a load limit device installed!

Even without a load, the boom may only be moved in those ranges where load bearing capacities are specified.

Before a load is raised, its weight must be known. The safety device may not be used to determine the weight.



To ensure that the load limit device functions properly, it must:

- be set by the crane operator in accordance with the crane configuration **before work is commenced (as soon as the** configuration is achieved) after the ignition/engine is switched on.

- **reset** by the crane operator in accordance with the new operating mode once the crane configuration has been changed.

This is set by selecting the operating mode.
Only when the load limit device has been correctly set by the crane operator in accordance with the current operating mode/crane configuration, can it operate automatically.
The crane operator is responsible for the correct setting by acknowledging the crane configuration.

Danger of accident – limits of the load limit device!
Despite a functional load limit device that is correctly set in accordance with the crane configuration, the load limit device can become ineffective in particular cases/operating errors:

- **insufficient load bearing capacity on the ground used for the set-up site of the crane**
- **support errors**
- **not switching on the prescribed telescoping sequences**
- **influence of the wind**
- **diagonal pull**
- **dynamic influences, e.g. by crane movements that are too fast and end with an abrupt stop**
- **dismounting work, if loads are unscrewed/burnt off after slinging, then hang loosely from the crane and prove to be too heavy**
- **lifting overloads with the luffing gear**
- **cooperation of several cranes.**

The crane operator must observe these system limits when setting up and operating the crane!

The load may only be taken up by the hoist in hook operation. If the load is still in contact with the ground and raising of the hoist has been switched off, the load is too heavy. In this case, activating the "Lift main boom" movement is not permitted! This movement is not to be used to lift the load under any circumstances!

It is essential for the operating safety of the crane that the IC-1 crane control functions in its original condition. Necessary updates can be obtained from the after sales service department of the crane manufacturer.

Danger of crushing!
The swinging out of the load during switch off cannot always be avoided, even with the use of automatic safety devices! It can be avoided only by all crane movements being carried out at appropriate speeds.
Also take note of the continuous display of the load moment with preliminary warning at 90% of the permissible load moment prior to switch off.

Risk of crane control system being influenced!
The risk of the load limit device being influenced by high-frequency radiation is minimized by the latest technology (shielding). It cannot, however, be completely excluded – in particular under extreme conditions, for example near powerful transmitters.

Bridging load limit device

Bridging shutdown of movement which decreases the load moment "Raise luffing gear"

If a prohibited overload condition has occurred, the load-moment-reducing movement "Raise luffing gear" is also shut down by the load limit device. Only lowering of the load on the hook is permitted.

Once an overload condition has been switched off by the load limit device, load moment reducing movements can be carried out to move a **freely suspended load out of the overload range** again, back into the normal operating range. In this case the key-operated pushbutton (116) must be pressed. Indicator light (115) lights up.
The status display "LLD" (or LMI) changes from red to black on the IC-1 display.

The override can only be initiated if the control levers are in the neutral position and/or the initiated crane movement is finished.

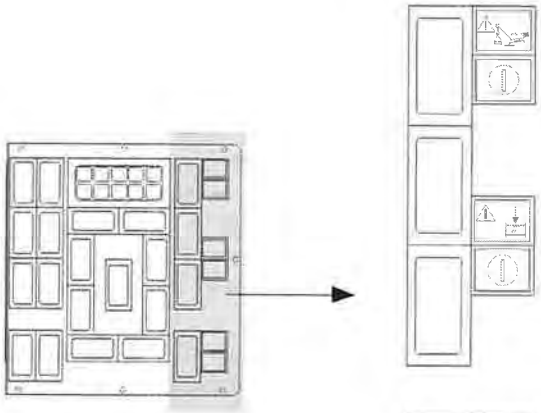
RISK OF ACCIDENTS!
This load moment reducing movement may only be enabled if it does not present a hazard. Make sure that this is the case before pressing the key-operated pushbutton.

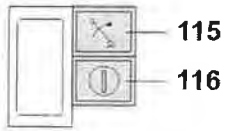
If the load is still in contact with the ground and raising of the hoist has been switched off, the load is too heavy. In this case, activating the "Raise luffing gear" movement is not permitted!

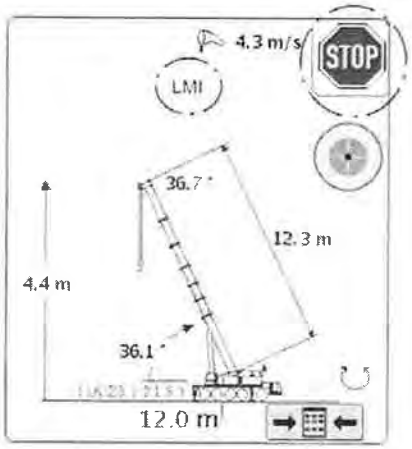
This movement is not to be used to lift the load under any circumstances!

Danger of falling backwards!
In some cases, enabling the movements which reduce the load moment is not permissible.

This is the case, for example, if "Raise luffing gear" is switched off due to the permissible minimum radius being reached.
In this instance, bridging is not allowed and the load-moment-reducing movement "Raise luffing gear" cannot be continued, because the crane could tip over backwards.







Bridging the shutdown of all movements

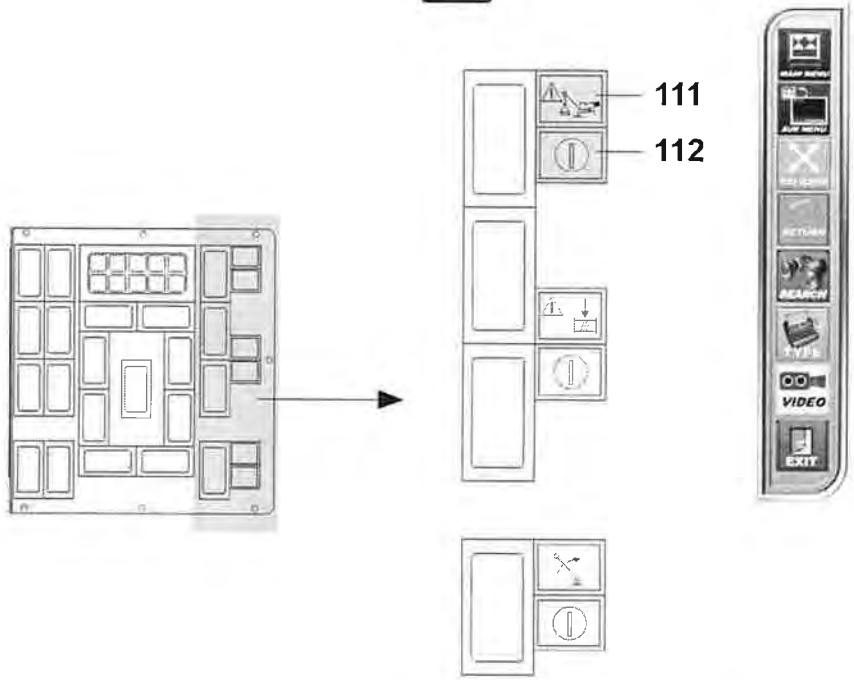
The load limit device can be overridden using key−operated pushbutton (112).

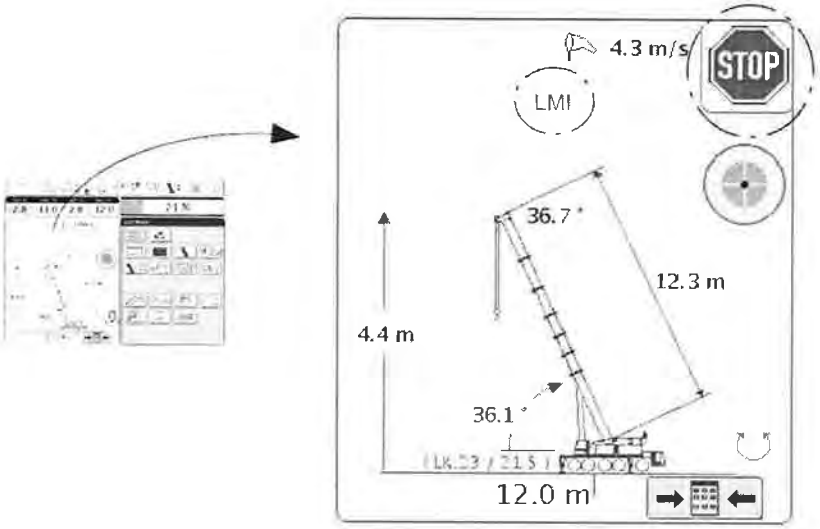
The override can only be initiated if the control levers are in the neutral position and/or the initiated crane movement is finished.

The button must be turned in the clockwise direction and held in this position.

When overridden, indicator light (111) lights up.
The status display "LLD" (or LMI) changes from red to black on the IC−1 display.

The load limit device may only be overridden in exceptional cases, for example in case of repairs, fitting a rope etc.
This can only be done by authorized personnel who are familiar with the operation of the crane!
The bridging of the load limit device may not be used to increase the load moment under any circumstances.
Lifting a load with the load limit device overridden is prohibited!





Control and display elements

(1) – Adjustment toggle for adjusting inclination of the display
(2) – IC–1 display
This display has a large color monitor to enable the information shown to be read easier. The brightness adjusts itself automatically to the ambient conditions.
All keys are activated by tapping the symbol (touch screen) directly with the finger.

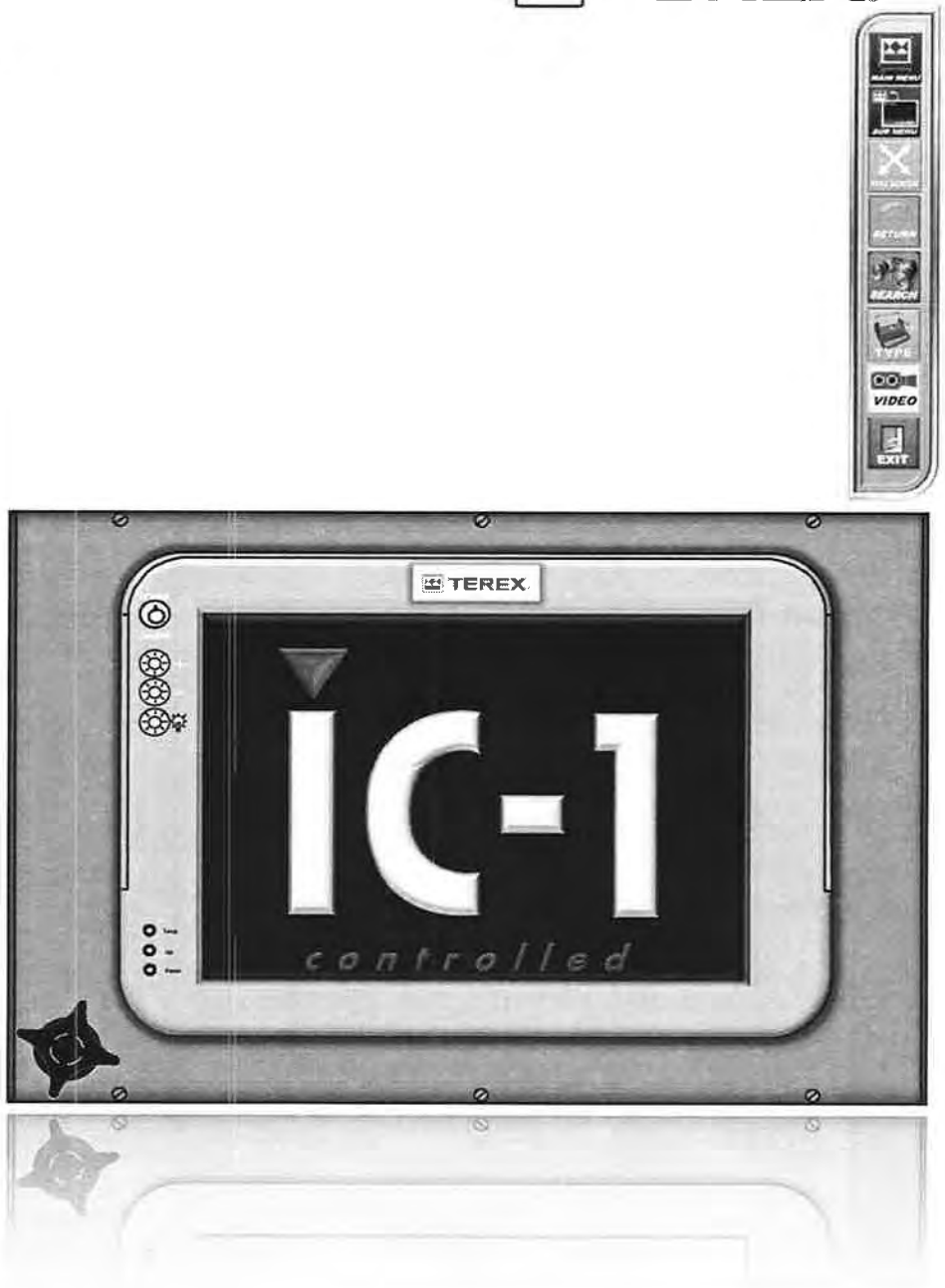
RISK OF DAMAGE!
Adhesive materials may not be affixed to the monitor! Mounting stick-on labels would destroy the monitor (touch screen)!
You will get the best results when cleaning the monitor by using a clean, damp, nonabrasive cloth and any commercially available window cleaning agent without ammonia. The window cleaning agent should be applied to the cloth first instead of directly onto the surface of the monitor.

(3)– On/Off switch
For rebooting the IC–1 when necessary: switch off ignition, wait at least 30 s, press switch for at least 3 s.
Switch ignition on again.

(4)– key: brightness "+" (manual)
(5)– key: brightness "–" (manual)
(6)– key not allocated
(7)- lamp: temperature warning

If the temperature in the computer is lower than 0^0 C, the LED lights up red and the computer is heated internally. When the temperature is more than 0^0 C, the computer starts automatically.
The heating procedure can take between one and eight minutes, depending on the outside temperature.
The computer is ready for use as soon as the red LED (temp, 7) goes out and the green LED (power, 9) illuminates.

(8)- lamp: hard drive
(9)- lamp: operating condition



Operating the IC-1

For this system, all functions are operated by "tapping" the keys or buttons shown on the monitor (touch screen).

By tapping a key/active button, a selection window is opened for parameter selection (1), or the display changes to another selection window.
When opening a selection window, a list of selection options (pull down menu) appears in the selected area. A value must then be selected from the selection list. If the set value is not to be modified, then the previous value must be selected again from the selection list.

The values selected are always dependent on the previously selected settings. If, for example, crane mode is selected without main boom extension, then no values are offered for setting the parameter with main boom extension. These keys then only appear "grey". All parameters which can be set appear on a key in a black frame.

In principle, the following applies:

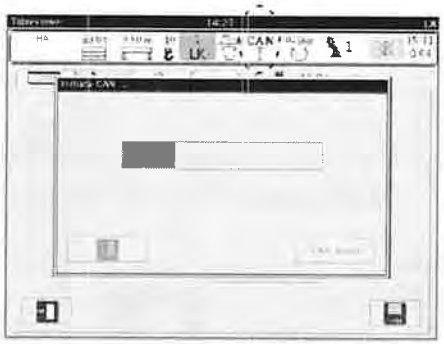
Diskette **"Save" symbol:**
selected setting is saved, and the display is changed

Door **"Exit" symbol:**
the display is left without saving the modified settings

"Red" entries
The displayed value must be changed or, at least, confirmed by tapping. Otherwise, the settings for the crane mode cannot be saved.

System start/Switching the system off

The IC-1 is automatically started when the ignition is switched on. At the same time, a system check is made automatically. Depending on the temperature of the computer (monitor), the display of the previously set crane status with the "CAN initialization" screen positioned above it appears after an appropriate warm-up time.
Momentary "error" displays appearing during the automatic check serve to test the functional reliability of the system, and are of no importance to you.



screen appears after the

If the computer is recognized by the PLC within 30 s, the CAN initialization screen closes automatically. The CAN status in the uppermost line changes to "OK".

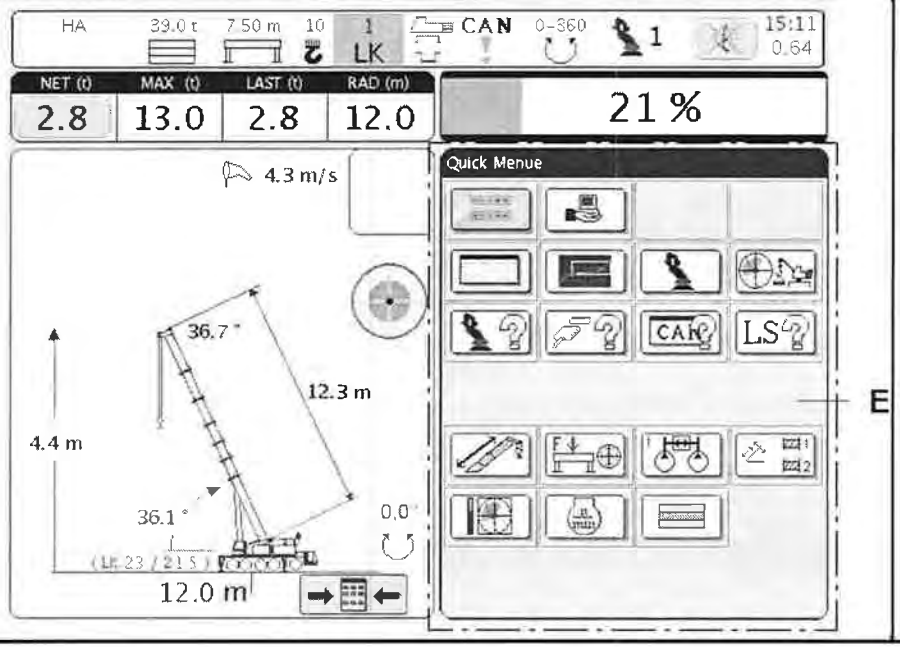
The CAN status can have the following conditions:

STOP	crane operation not permissible
	a subscriber is missing, but not relevant
OK	crane operation permissible

If CAN initialization is not initialized within 30 s, the screen is not closed automatically. The two keys  and "CAN reset" are activated and must be actuated manually:

1. Option: actuate "CAN reset": the initialization is restarted. If that doesn't work:

2. Option:  **actuate: a screen appears (fig.3) for selecting** the operating mode in non-active status. That means that an entry is not possible for the "type" field, so crane operation is not permissible.
The existing error must be located – for example, with the help of diagnostics screens – and removed. It is only then that the initialization can be restarted.



E

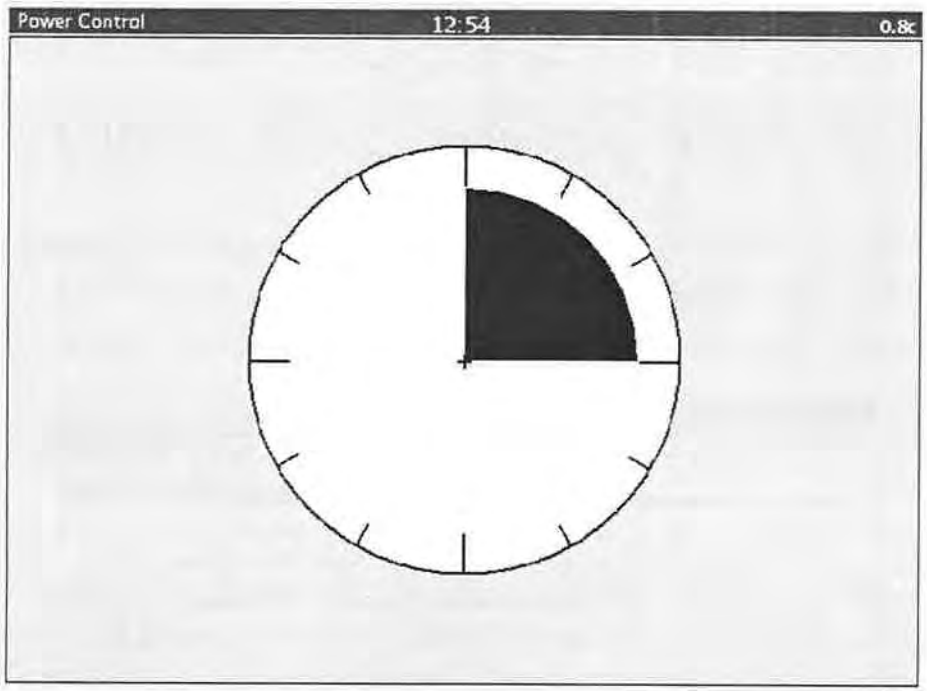
If the assembly or operating condition remains unchanged, the screen can be exited via 

If the assembly or operating condition has been changed, the specifications in the screen must be adjusted accordingly (fig.1). In order to be able to transfer the modifications to the control system, the screen must be exited in this case via 

In both cases, the "Crane operation" screen then appears (fig.2).

As a starting point for using the IC−1 functions, the most important screens are "crane operation, (fig.2) " − and specifically area "E", the screen "Quick Menu" and the screen "main menu

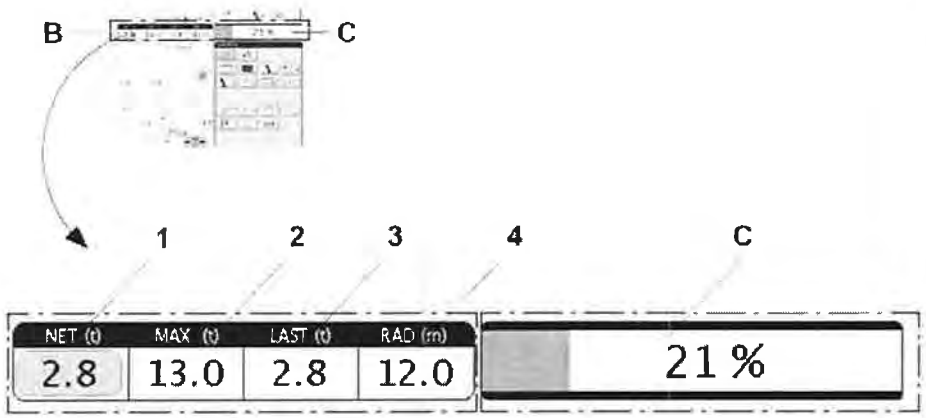
Using these screens the desired functions can be selected by calling up the corresponding submenus.



Power control

When the electric power supply fails, or after switching off the ignition, the display changes automatically to the "Power control" screen. The remaining time (starting at 15 min.) up to switching off the computer is displayed here. If the ignition is switched on again within this time, the display changes directly to the "Operating mode selection" screen. IC−1 is immediately ready for use again.

The ignition can be checked after three minutes. If the ignition is switched on and then switched off directly after, it can take approx. three minutes until the "Power control" screen is selected.



Section (B): display of load and radius

(1) – Net load
By pressing the "Net" button, the current load is tared.

(2) – Maximum load (for the set crane configuration)
For loading in the longitudinal code (LC 1), the loading symbol appears instead of the maximum load.

It is then prohibited to raise loads

(3) – Current total load (gross load)
This includes load, hook block, all lifting tackle and, if applicable, additional device attached.

(4) – Current radius

Section (C): loaded display

Continuously changing display of the load moment as "bar display" with superimposed display percentage/overload display.
For loading in longitudinal code (LC 1), the whole field (C)

is shown in red with 3 stars instead of the bar display 

Raising of loads is prohibited.

A warning buzzer sounds when the **pre-warning range (90–99%** of the max. permissible load moment) is reached, and a warning

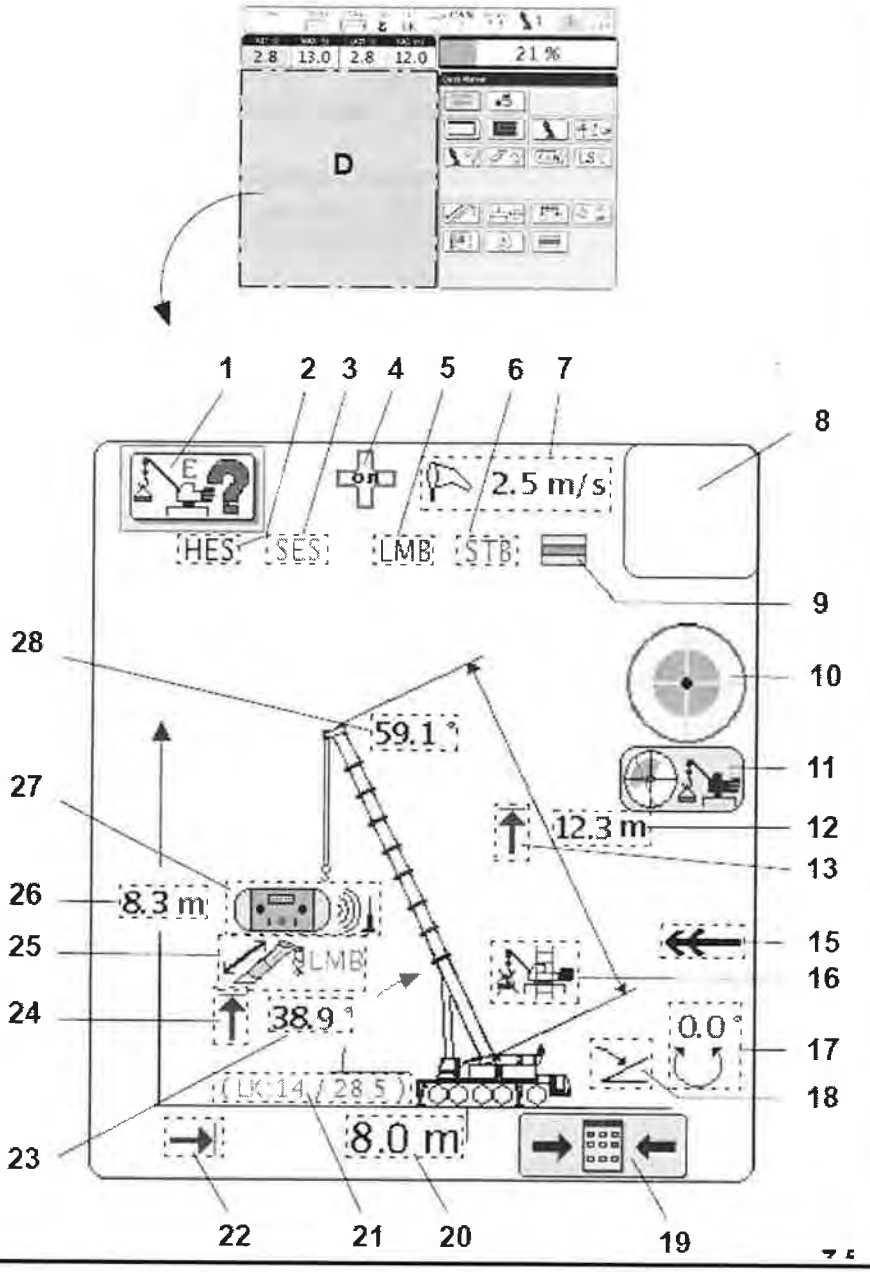
symbol  appears the color of the bar display changes from

green to yellow.

When the **overload range is reached, the load limit device shuts** down movements which increase the load moment and "Raise luffing gear". A continuous tone sounds and the Stop symbol

appears. In addition, the color of the bar display

changes from yellow to red. Lifting of loads is not permitted!



Section (D): display of status information on crane condition

(1) – "Error" display: is superimposed when an error occurs
(2) – "**HES (red)**": **lifting limit switch triggered, and not bypassed**
"**HES (black)**": **lifting limit switch bypassed, regardless** whether triggered or not
(3) – "**SES (red)**": **lowering limit switch triggered, and not bypassed**
(4) – Emergency operation (optional) is active (see Section 36)
(5) – "**LLD (or LMI) (red)**": **load limit device is switched off, and** is not bypassed "**LLD (or LMI) (black)**": , **load limit device is bypassed, regardless** whether it is switched off or not;

simultaneously appears STOP

(6) – Reading below min. permissible outrigger pressure (< 1 t)
(7) – Current wind speed
(8) – Fade–in of different symbols:

: Pre-warning range; 90%–99% of the permissible crane load reached

: – Load limit device is switched off
– Load limit device is bypassed

Load capacity table being loaded; only appears for a few seconds; crane operation is not permissible during this time

(9) – Counterweight control overridden
(10) – Current tilt
(11) – Working range limit
active; can be deactivated by tapping
(12) – Length main boom

(13) – Max. main boom length reached
(15) – High speed
(16) – Configuration mode: raising of loads prohibited
(17) – Current slewing angle (see Section 8 "Slewing")
(18) – Slewing operation in open circuit (see Section 8 "Slewing")
(19) – Key for calling up the "Quick menu" screen; is used especially if the free is assigned with a submenu which otherwise provides no option to exit.
(20) – Current radius
(21) – LLD relevant LC and radius step

(22) – → | ← (red): min./max. radius reached, LLD switches off

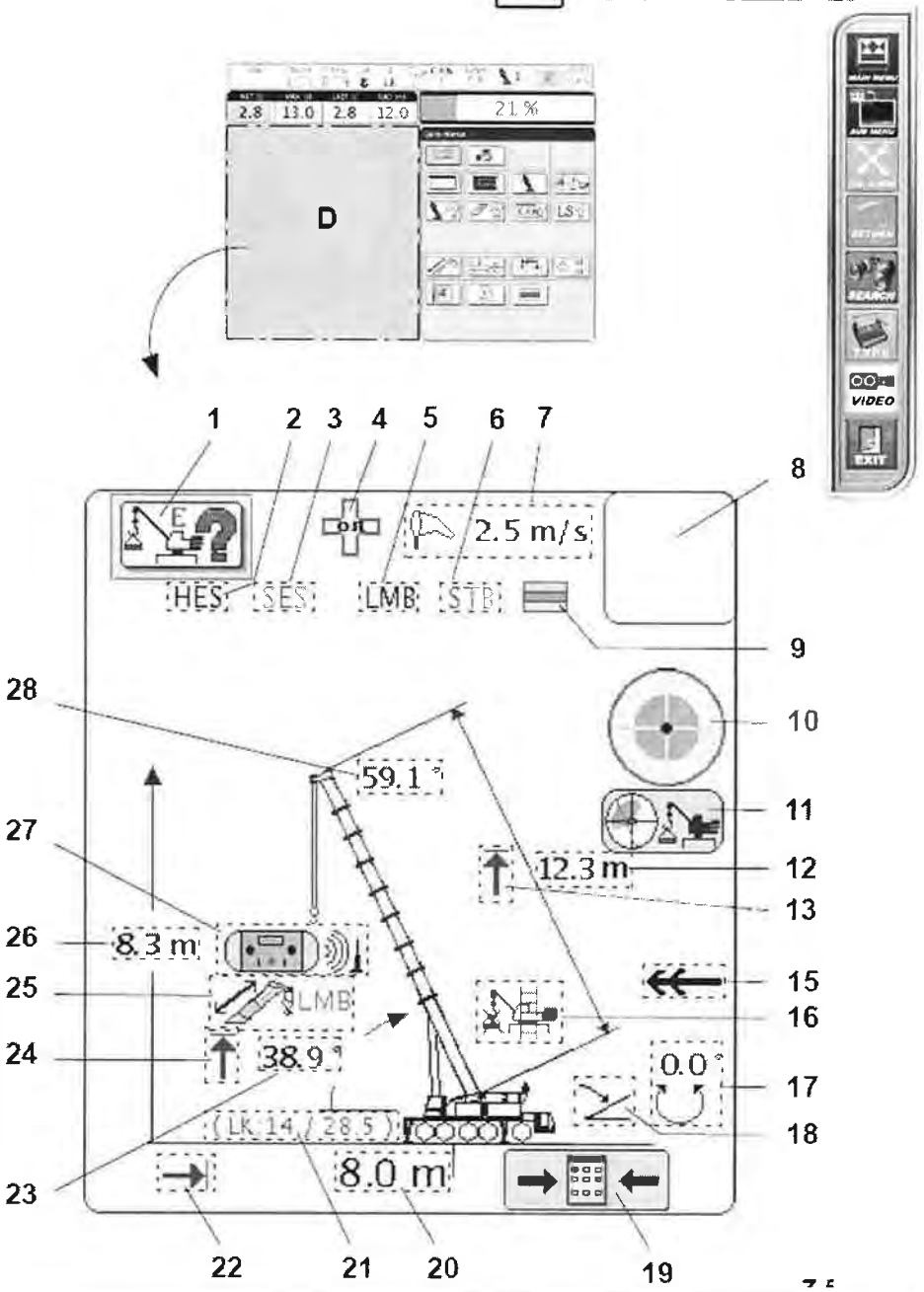
→ | ← (black): min./max. radius reached LLD shutdown bypassed

(23) – Angle of the main boom to horizontal (foot angle)

(24) – ⊼ ⊻ (red): min./max. main boom angle reached, LLD switches off

(black): min./max. main boom angle reached, LLD shutdown bypassed

(25) – Telescoping is only possible with bridging of the load limit device due to telescoping error.
(26) – Head height
(27) – Radio remote control (optional) active operation no longer possible on the IC-1 display
(28) – Angle of the main boom to horizontal (head angle)



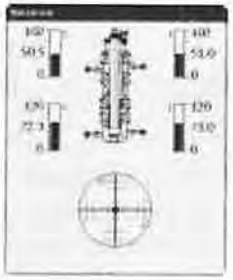
(E) - Quick menu:

In addition to the display mask of the main menu, further masks can be called up here:

- E11 Main menu

- E51 Telescoping information system

-E52 Support pressure gauge



Display of support pressures as well as tilt. The display bars are colored red if the support pressures are in the limit range.

- E53/54 Activates the pumps together or separates

them. The current mode is displayed in the top left-hand button. The corresponding movements are displayed in the right-hand button.

A mode is changed by pressing the buttons.

The following modes are available.:

Option hoist 2.

-E55 Display of the operating range limits

The active limits are displayed in the top status bar (**E1**). **The valid operating range is always** displayed in green.

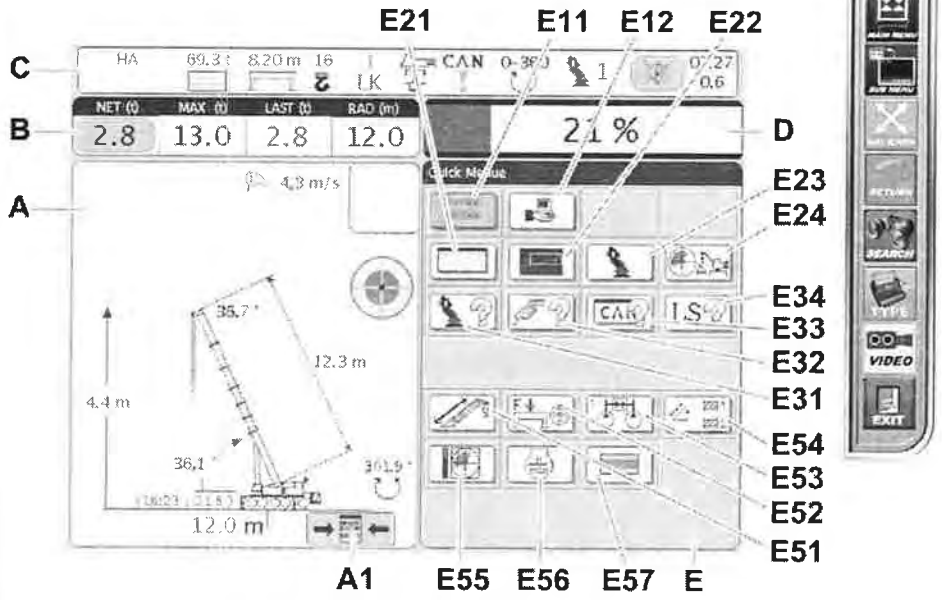
- E56 Switches to engine display.

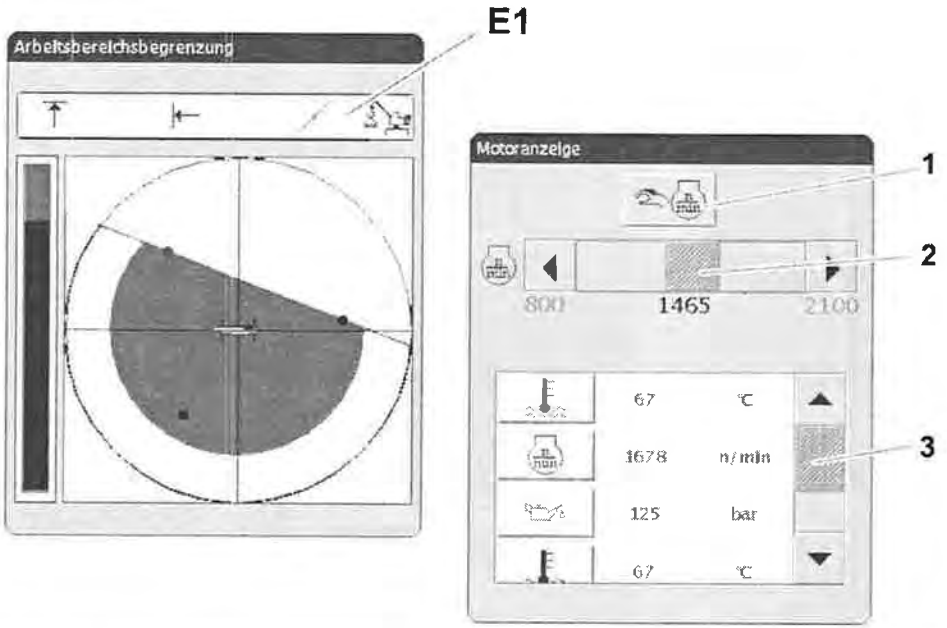
1: Button for automotive driving. The button is green when automotive driving is active.

2: Slide control switch for manual minimum speed.

Min. value is 800, max. value is 2100. The current value is displayed in the center.

3: Slide control switch for various engine information.





E57 Changes to the counterweight display.

Display aid when configuring the counterweight.

Cylinder up, unpinned, status 1

cylinder intermediate position, unpinned, status 2

cylinder down, unpinned, status3

Cylinder down, Bolt intermediate position status 4

cylinder down, pinned, status 5

cylinder intermediate position pinned, status 6

Cyl. raised pinned, status 7

1/2 def. / undefined state

Driving slewing gear permitted / not permitted.

Superstructure pinned / superstructure unpinned.

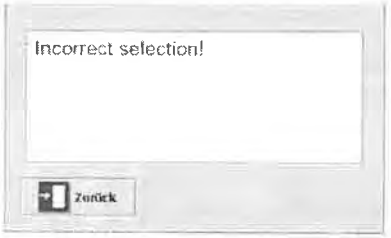
The arrow in figure „Counterweight pinned status 2" is always displayed when the switch for driving the counterweight is displayed.
The quick menu can be called up again for every other display using button ***(A1).***

(Quick menu E21) Operating Mode Pre-selection Mask

In the manual view the individual configuration parameters can be set.
If changing a parameter results in another parameter being changed as well, the second parameter is displayed in red.

Values in red must be confirmed by the operator, i.e. he must press the button again. If the button appears again with a red background and black writing,

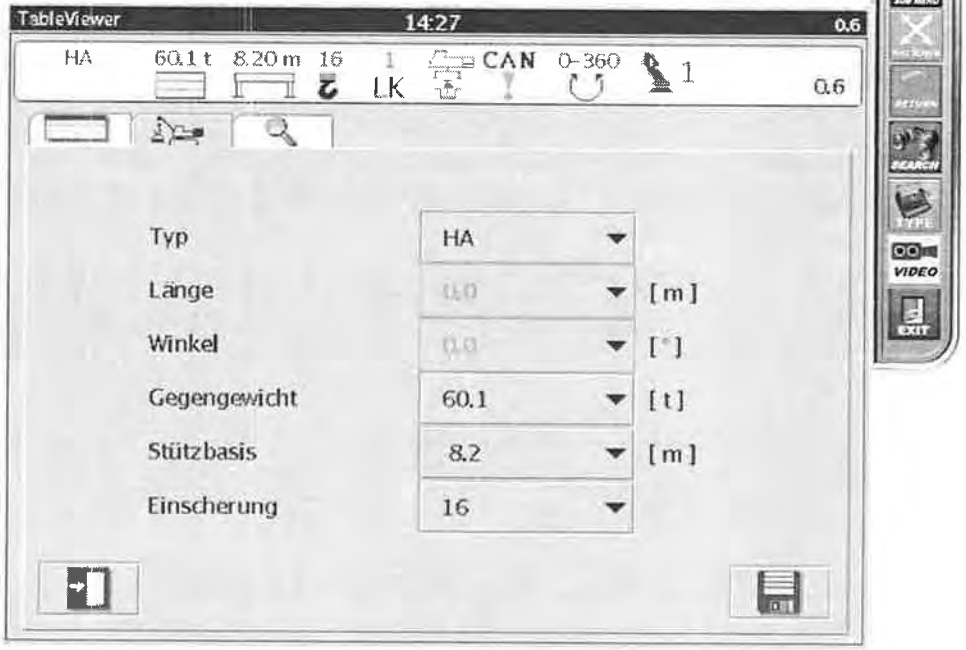
this configuration cannot be set due to the current crane condition.
Selection options that contain only one parameter cannot be changed.
If a parameter is displayed in red, the mask cannot be left by saving. The following dialogue appears:



Special types of operating modes

* The main boom extension can only be selected if the main boom length is shorted than 23 m.
* MS can only be selected if the main boom angle is smaller than 10°.

The previously set configuration state is disregarded when you leave using Exit. The mask automatically changes to the mask that was last displayed.
The operating mode selection mask is always called up when the computer is started again. The LLD mask is started up when this mask is exited for the first time.



Exiting / saving

The system first checks if the current extension sequence of the tele cylinders (length code LC) exists for the selected configuration state when exiting the mask using Save. If the LC is not in the selected table, the following dialog appears and the operating mode selection mask is not exited.

If a release is given after the check, the set configuration state is transmitted to the SPS and the system switches to the previously displayed mask. The following figure is displayed during the data transmission to the SPS.

By pressing „table" in the operating mode mask, the loads of the set configuration state are indicated.

1: Length code LK

2: Main boom end length

3: Radius

4: Loads

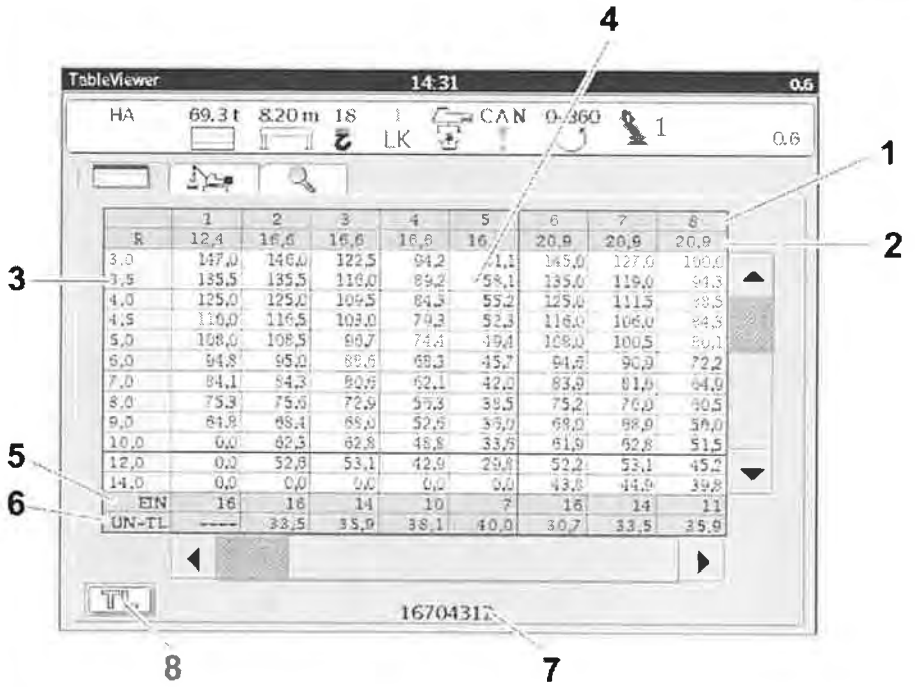
5: Min. reeving

6: Unpinned loads

7: Table identification number

8: Information on special loads. An information dialog appears when the button is pressed.

It is only visible if there is an existing special load.



Search

The load and radius can be determined by pressing "Search" in the operating mode mask, and the system automatically searches possible configuration states.

The data is entered using the buttons Load and Radius. The search is started using the button Magnifying Glass. All found configuration states are entered in the bottom selection element after the search.

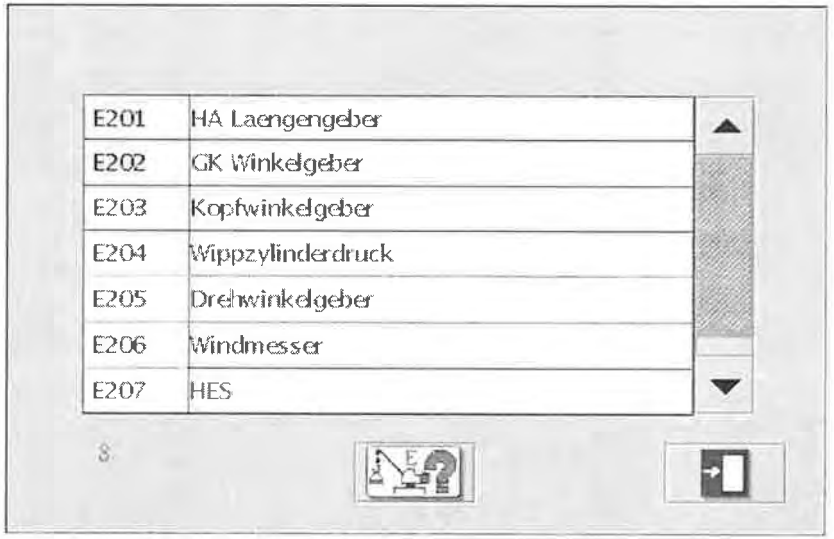
Error Message

All active errors of the SPS are indicated in the dialogue Error Messages. All error messages remain until viewed.

Error button

The error button is always visible in the main menu. If the main menu is active and a new fault is transmitted from the SPS to the computer, it is displayed in „red".

The fault button is always displayed in „red" in all other masks when a new fault has occurred, an existing fault no longer exists or the last fault signal has not been called up. This means that as long as the fault button is displayed in „red", something has changed and this must be confirmed be pressing the button.



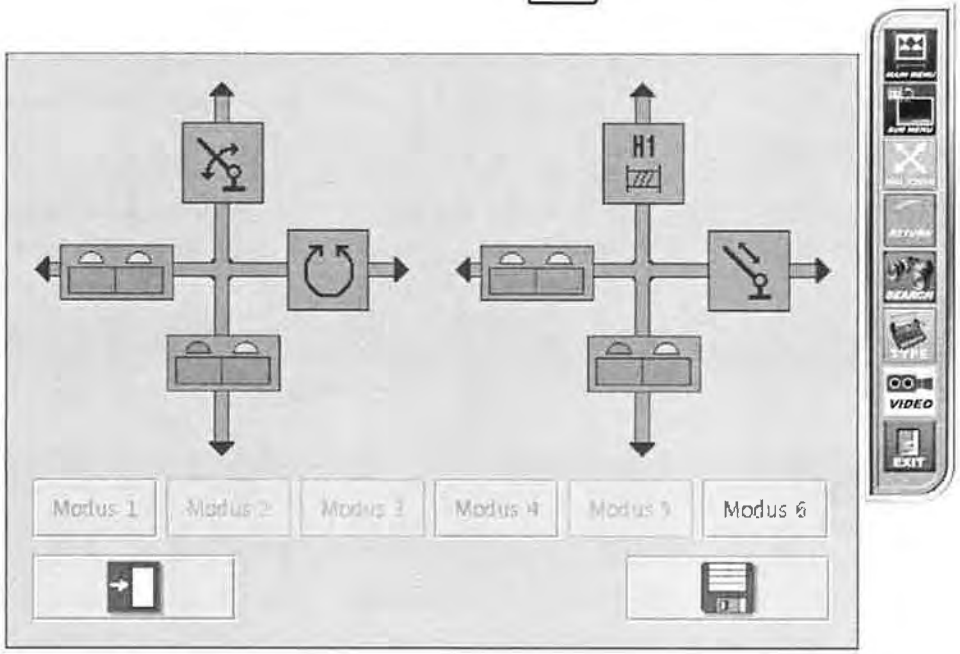
(Quick menu E23) Pilot control valve assignment

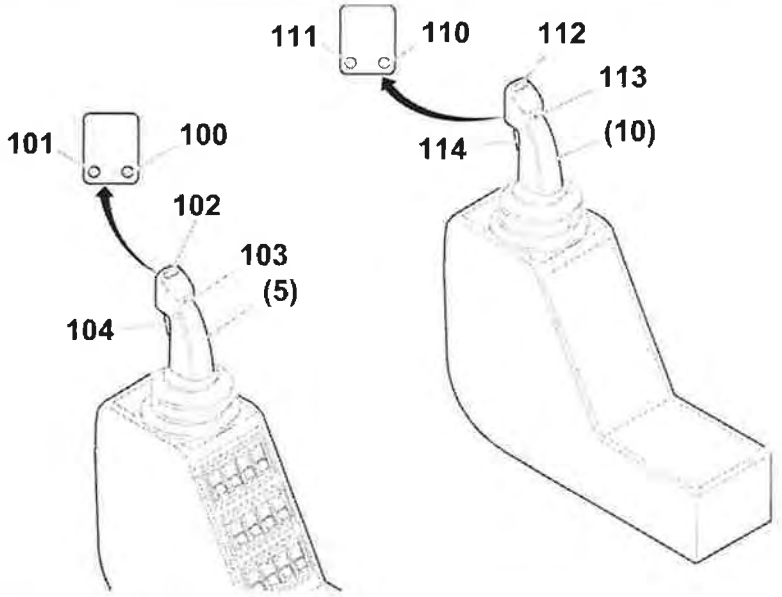
Depending on the crane equipment, different modes can be selected. The option Hoist 2 is an example for a new assignment, see below:

Mode 1:	JLH = Slewing gear JLV = Tele	JRH = Luffing gear JRV = Hoist 1
Mode 2:	JLH = Slewing gear JLV = Hoist 2	JRH = Luffing gear JRV = Hoist 1
Mode 3:	JLH = Slewing gear JLV = Tele	JRH = Hoist 2 JRV = Hoist 1
Mode 4:	JLH = Luffing gear JLV = Tele	JRH = Slewing gear JRV = Hoist 1
Mode 5:	JLH = Luffing gear JLV = Hoist 2	JRH = Slewing gear JRV = Hoist 1
Mode 6:	JLH = Slewing gear JLV = Luffing gear	JRH = Tele JRV = Hoist 1

(J = Joystick, R = Right, L = Left, H = Horizontal, V = Vertical)

The speeds of the crane movements "Slewing gear", "Hoist 1", "Hoist 2" and "Luffing gear down" can be finely tuned additionally.
The movements that are carried out via the **x-axle (horizontal** movement of pilot control lever) of the individual pilot control lever can be regulated via the corresponding self-return rocker switch (**102/112). The movements that are carried out via the y-axle** (vertical movement of the pilot control lever) of the individual pilot control lever can be regulated via the corresponding self return rocker switch (**102/112) and by pressing the keys (100/110; on the front side of the pilot control lever in the direction of** travel, always left) at the same time.

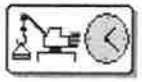




Programming pilot control sensor

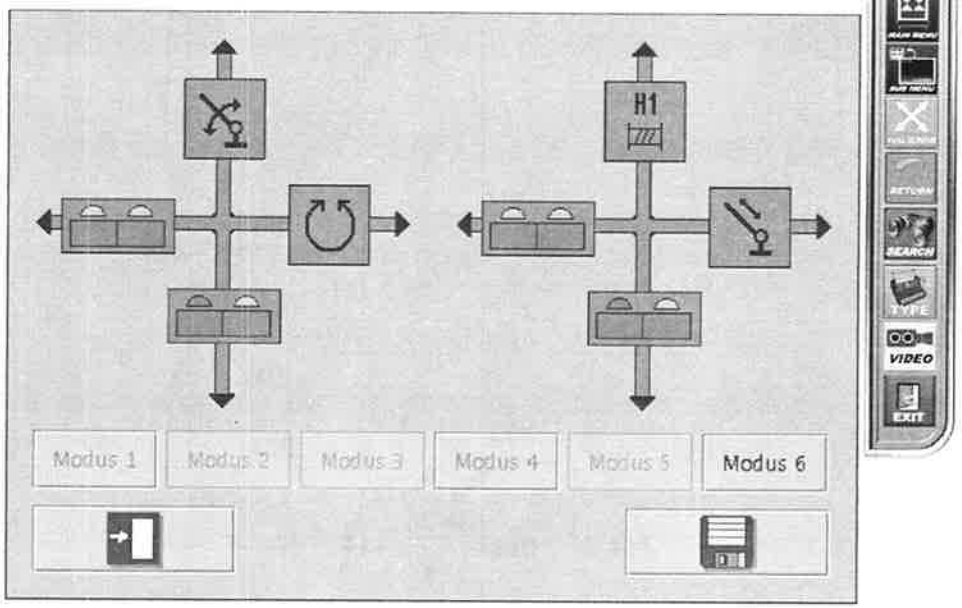
If a dialogue "pilot control assignment" is started from the main menu, an additional button "setup" appears.

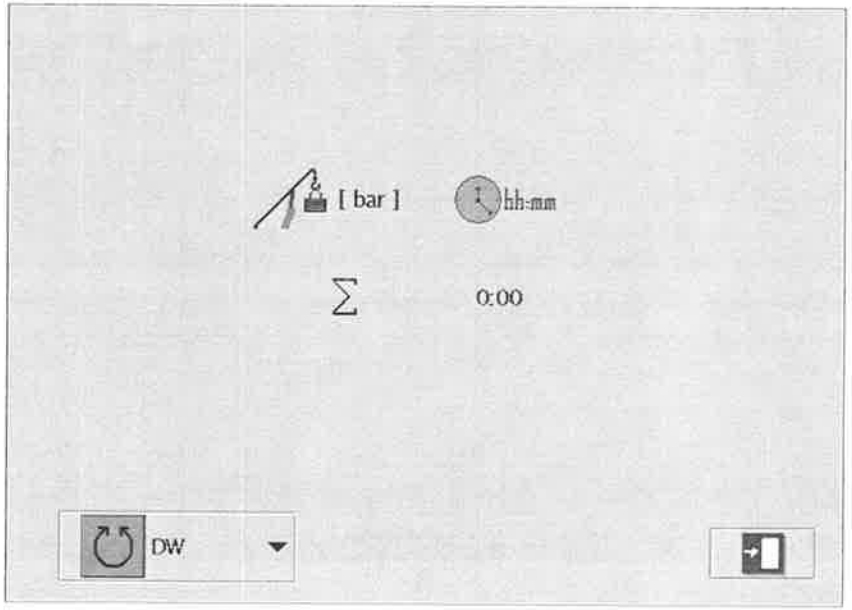
The setup button provides the option of programming a left control to be a right control. This option is protected by a special PIN and can only be carried out with the help of our customer services.

Hour meter 

The operating hours of the crane movements slewing gear, hoists, luffing gear and tele unit are shown here. The display of the operating hours is in „Hours : Minutes".

There is a differentiation between ***load and rope load in the*** *hoist unit (H1-****L, H1-S).***





(Quick menu E22) Parameter mask 

(fig;1)

The solenoid valve data for the individual crane functions is set in the parameter menu. The data set "slewing gear left" of the SPS is shown when changing to the mask.

Selection of a crane function (fig;1)

The popup dialogue (fig;2) is opened by pressing the Combo Box (**1).**

A new function can be selected here. The SPS sends your data to the display as soon as you have made your selection.

Entering a parameter (fig;1)

The entry dialogue (fig;3) is opened by activating a parameter button (**2).**

The valid entry area is indicated behind the **OK symbol. If this** area is exceeded, the entry is indicated in red. The last symbol entered can be deleted with the arrow. The entry is saved by pressing the diskette and directly transmitted to the SPS. Entry is cancelled via the Exit button.

Selection of a stored data set

The menu window (fig;4) is opened by clicking on the menu button (**3).**

1 Load setting 1

2 Load setting 2

3 Load setting 3

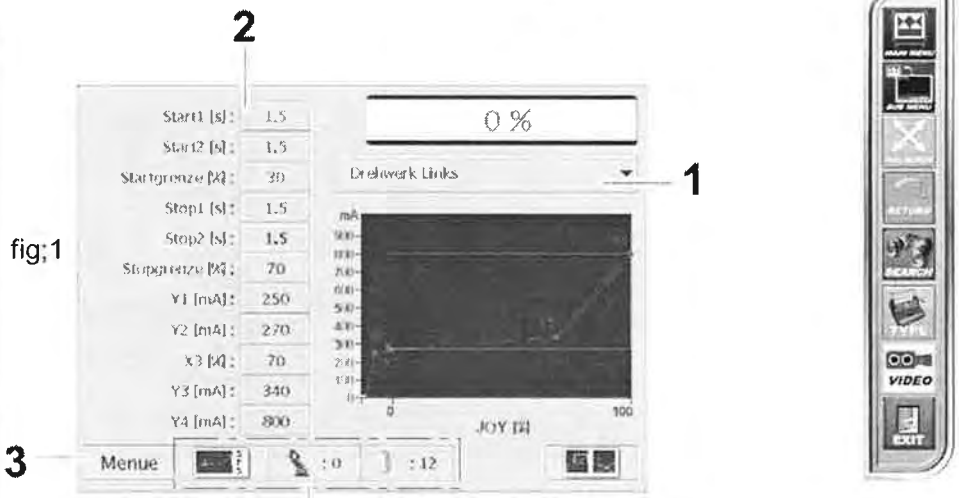
4 Load factory setting

5 Load current setting of the SPS

6 Save settings

7 Exit parameter menu

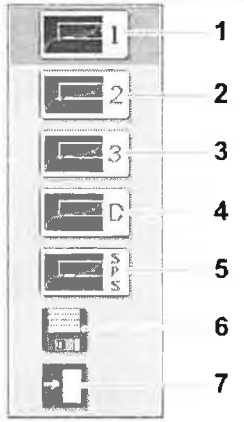
Various settings can be loaded or saved here. The parameter menu is ended via the Exit symbol.



fig;1

fig;2

fig;3



fig;4

If a new setting is loaded from the computer it must be saved with the disc symbol. That means that the setting will then be transmitted to the SPS.

The factory setting cannot be modified. Only the factory setting can be selected for the functions Tele On and Off as well as the slewing gear brake and emergency clutch, which means that the crane operator cannot store any personal settings.

Status display 

Data set which is currently saved in the SPS (1, 2, 3, D). If the data record of the SPS does not correspond to any stored on the computer, SPS appears in the symbol. Otherwise the number of the corresponding data record is displayed.

Control value of the pilot control transducer 

Output current 

Graphic display

The graphics display can be changed by activating the button, position 5. The time ramp and the PWM ramp can be selected.

Copying a data set

If for example the factory setting is to be assigned to setting 1, the procedure is as follows:

Load the factory setting 

from the menu window and save with the diskette  .

Afterwards load setting 1 

from the menu window.

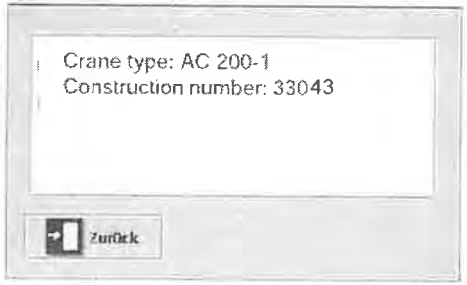
Then load the current SPS setting 

via the menu into the data set setting 1.

Finally, conclude the procedure with  .

INFORMATION 

Display of crane type and construction number.



(Quick menu E24) Operating range limits 

The crane operator can define the following limits so that the crane or boom do not enter existing danger zones, e.g. near overhead lines:

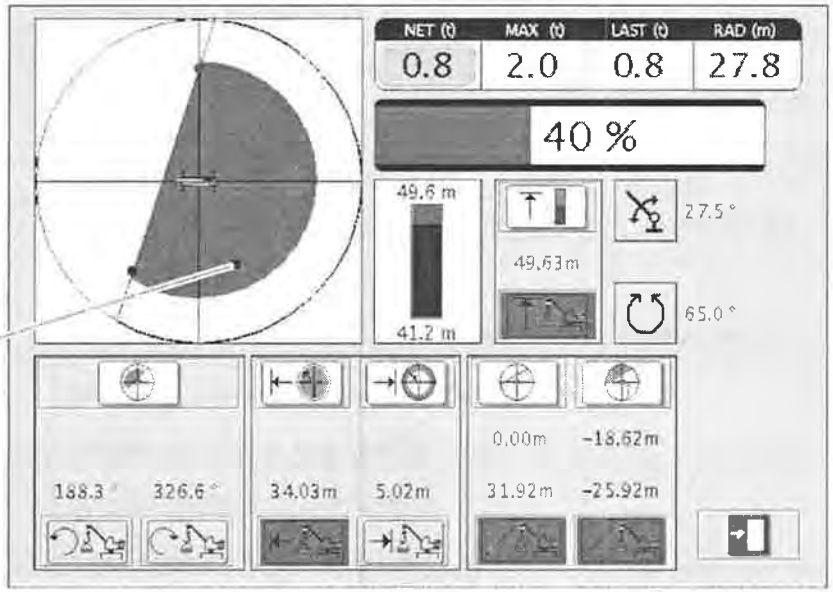
- Slewing angle limit
- Radius and height limit
- Operating range limit by virtual wall

The setting of operating range limits does not relieve the crane operator of his responsibility for safe crane operation.

He must ensure that he fully understands and follows the indicated instructions and applications.

Make sure you deactivate any activated limits as soon as operation within a limited operating range is finished.

Otherwise this could lead to an unintentional and abrupt shutdown during a later crane operation without limits, which accordingly causes the hook block / load to swing out widely.



Access to the mask for setting an operating range is achieved using the button . 

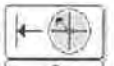
The limits which are active are displayed in green. The button Operating range limits must be pressed again to deactivate the set operating range, the button is then displayed in grey.

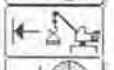
The position (**1) indicates the current position of the main boom** head.

 Activation of the slewing angle limit. The background behind the buttons is green when the slewing angle limit is active.

 Setting and saving the left slewing angle.

 Setting and saving the right slewing angle.

 Activation of the max. radius limit.

 Setting and saving the max. radius.

 Activation of the min. radius limit.

 Setting and saving the min. radius.

Especially make sure that the selected limit angle (= shutdown point) actually ensures sufficient distance to the danger area in extreme situations (e.g. the hook block swinging out after the crane motion has been switched off).

All crane movements must always be carried out with adapted speed.


Activation of the wall limit.


Setting and saving wall point A.


Setting and saving wall point B.


Switching over of the operating range to the wall.


When the inverted display is switched on the background is displayed in green.

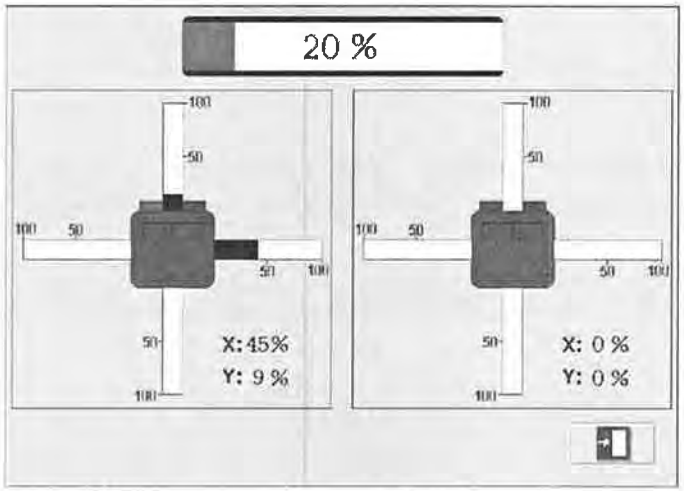
When setting and saving a wall a minimum distance of 8 m between the wall points must be adhered to.
If the distance is too small, the wall area will be displayed in red.

Especially make sure that the selected limit angle (= shutdown point) actually ensures sufficient distance to the danger area in extreme situations (e.g. the hook block swinging out after the crane motion has been switched off).

All crane movements must always be carried out with adapted speed.

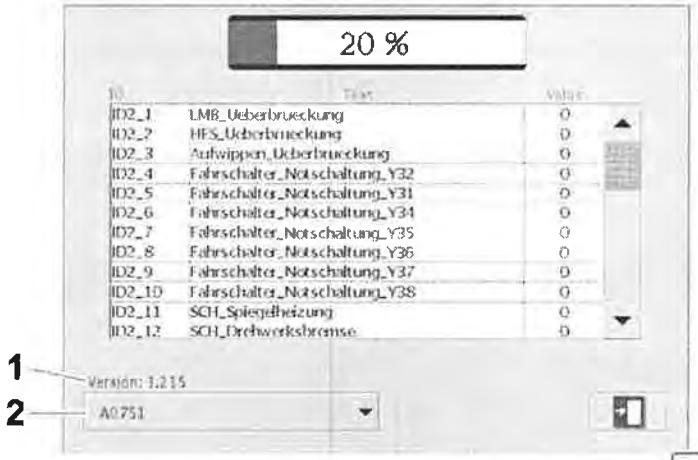

Activation of the height limit.

Setting and saving the height.



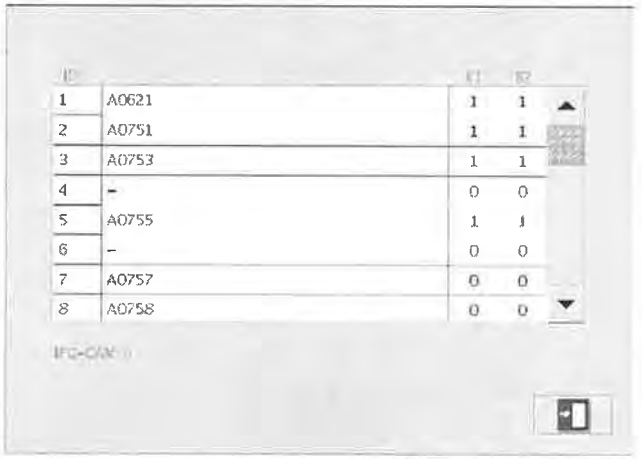
(Quick menu E31) Diagnosis Joystick

The function can be checked by moving the pilot control transducer.



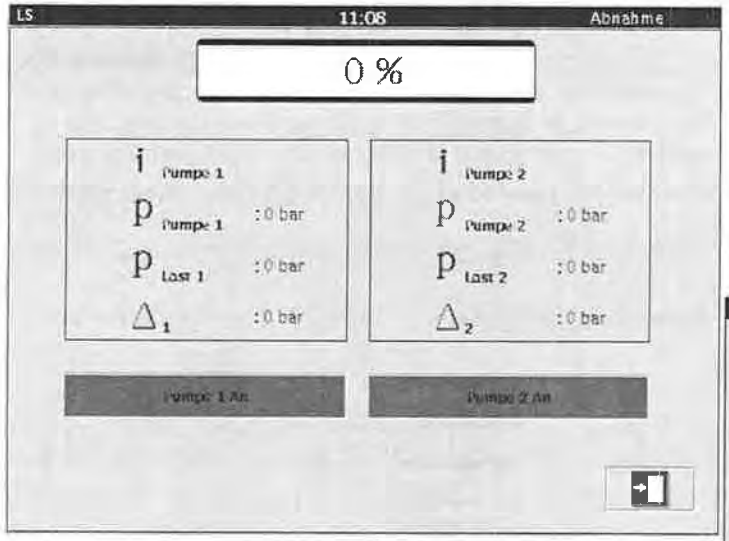
(Quick menu E32) Diagnosis of all control inputs / outputs

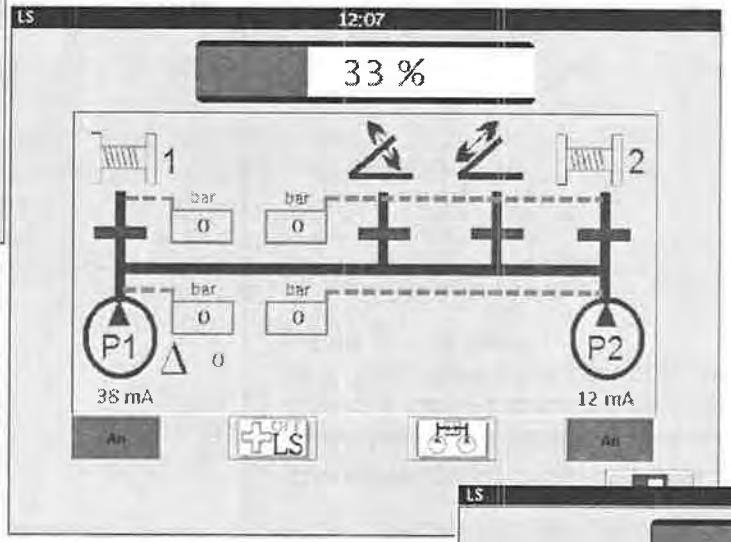
The individual inputs and outputs of the control unit can be checked in the IO menu. If the selected unit is a CPU unit, software version (**1**) **is displayed above the Combo Box (2). The** various units can be selected by pressing the Combo Box (**2**).

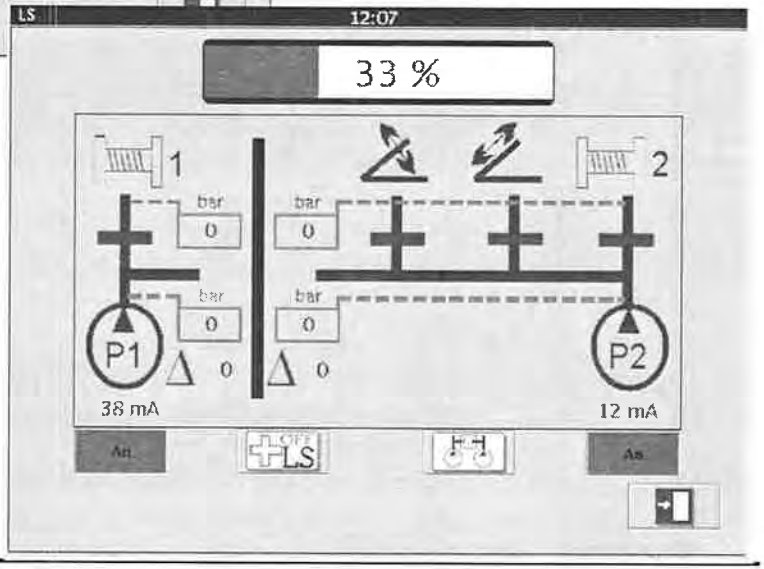


(Quick menu E33) Diagnosis CAN bus

The status of each individual CAN participant can be checked in the CAN diagnosis menu. The status of a participant is OK if the bits **B1 and B2 are on 1. This information is important for our** customer service department in case of malfunctions.







(Quick menu E34) Diagnosis LS 

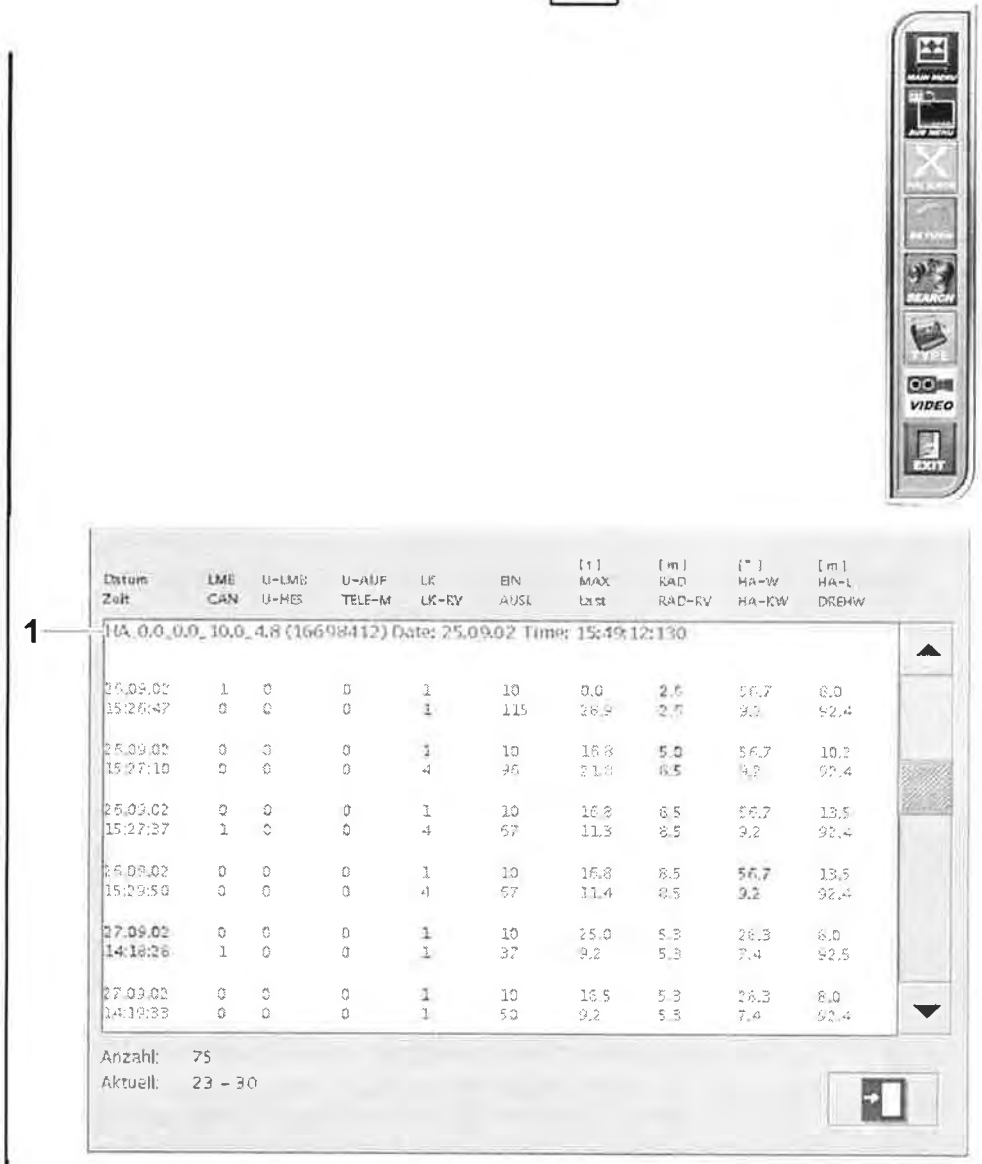
Diagnosis of the electrical Load Sensing System.
The display indicates the state of the pump: „coupled" or „separated", at the same time pump pressure and electric control can be read from each pump.

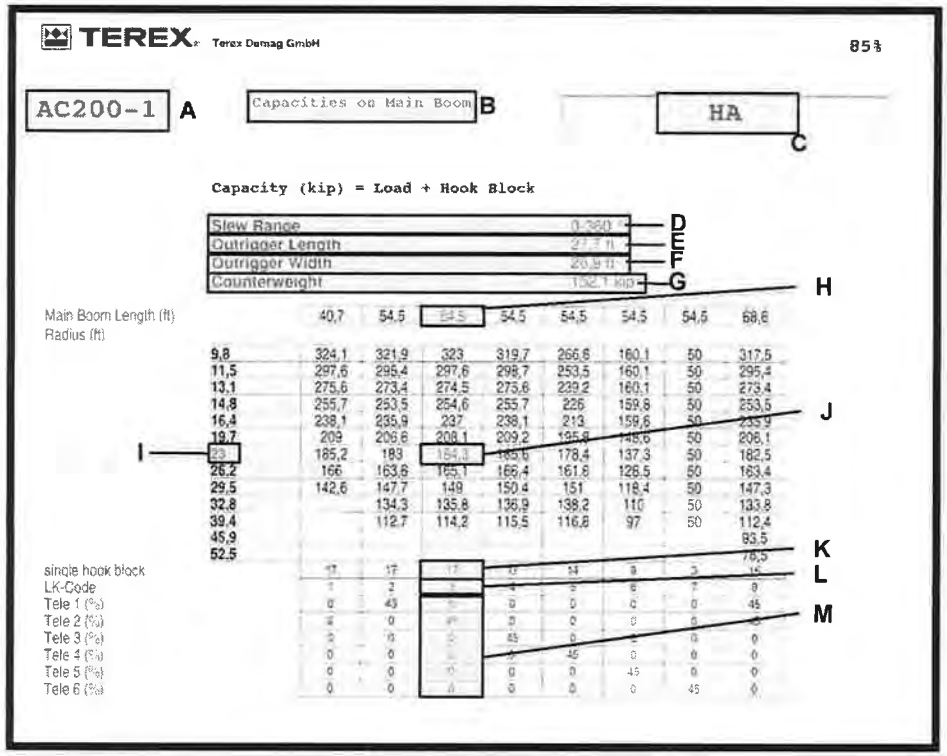
Data logger (optional)

The data logger saves each set configuration state of the crane. The current configuration state is displayed in grey font (**1**).
Date and time indicate when these configuration states were set.

Quantity:	The quantity of the currently set data records	
Current:		The currently visible data records
LLD:	0 =	Release
	1 =	No release
CAN:	0 =	CAN bus OK
	1 =	CAN bus fault
U-LLD:	0 =	Bridging switch LLD not activated
	1 =	Bridging switch LLD activated
U-HES:	0 =	Bridging switch HES (hoist limit switch) not activated
	1 =	Bridging switch HES (hoist limit switch) activated
U_AUF:	0 =	Bridging switch UP (luffing up) not activated
	1 =	Bridging switch UP (luffing up) activated
TELE_M:	0 =	Tele automatic active
	1 =	Tele manual active

LK: Selected length code
LK-RV: Length code which is relevant for load calculation
EIN: Hoist rope reeving
AUSL: Current crane load
MAX: Maximum load capacity
Last: Current load
RAD: Current Radius
RAD-RV: Radius which is relevant for load calculation
HA-W: Current main boom angle
HA-KW: Current main boom head angle
HA-L: Current main boom length
DREHW: Current superstructure slewing angle





Setting the operating mode

In order for the load limit device to function faultlessly, it must:

- be set by the crane operator according to the crane configuration before beginning work (as soon as the configuration state has been reached) after ignition / engine has been switched on.

-be reset by the crane operator according to the new operating mode after the crane configuration has been changed.

The load limit device can only function automatically when it has been set correctly by the crane operator in accordance with the individual operating mode / crane configuration.

Risk of tipping! Risk of breaking!

The load capacities indicated in the load capacity tables correspond 100 % with the permissible maximum load of the individual crane configuration. If these limit values are exceeded there is risk of the crane tipping and / or risk of the crane components or supplementary equipment breaking.

1. Select load capacity table (paper) which corresponds with the current crane configuration.

The following example shows where you can find these values in the load capacity table.

The opposite load capacity table is only an example. Only the load capacity tables supplied with the crane are valid for crane operation.

(A)- Crane type

(B) -Main boom operation (all telescopes pinned)

The computer automatically switches to a telescoping or configuration curve.

(C) - Abbreviation of operating mode(here; HA for working with Main Boom)

(D) - Permissible slew range: 0 - 360°

(E) - Outrigger Length

(F) - Outrigger Width

(G) - Counterweight

(H) - Main boom length

(I) - Radius

(J) - Maximum load capacity

(K) - Reeving number of the hoist rope

(L) - Length code no. of extension sequence (LK)

(M) - Extension sequence of telescopes

Load Monitoring Assembly

It is possible to check the weight of the raised load (net load) with the help of the computer of the load limit device.

The load monitoring assembly may not be used for determining weight; instead it serves for checking previously determined weights of loads in order to better evaluate the load stroke and to avoid possible dangerous situations.

The maximum load for the relevant operating mode must be determined before raising the load. It is indicated on the display in MAX (**B) in relation to the selected operating mode.**

Load check

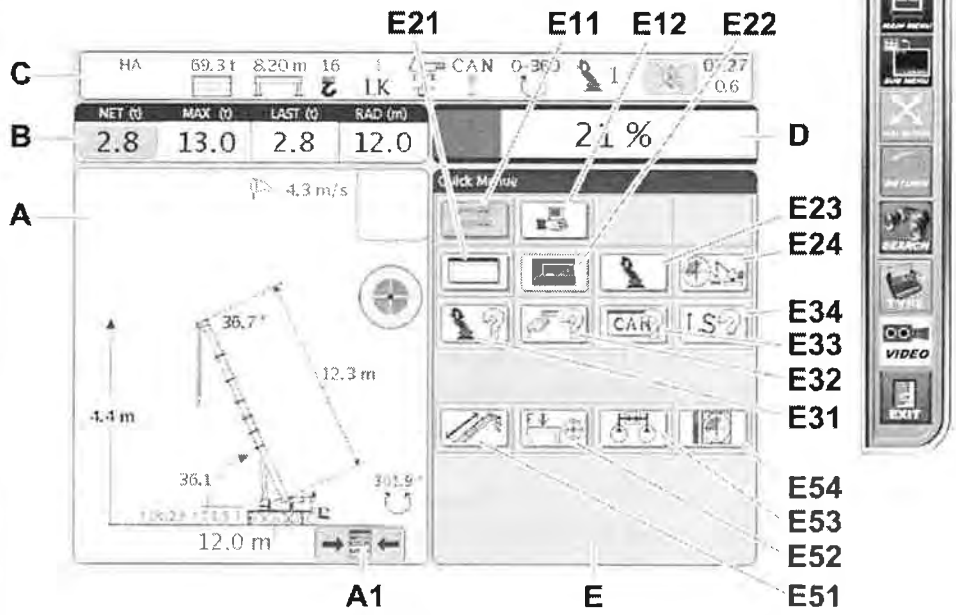
1.Press the button of the net display (**B) when the hook block is** hanging free (no load, with load handling device). The stop devices are tared and set to 0.0 t net load.

2.Raise load with hoist.

The net display now indicates the net load (actual load on hook without load handling device).

The gross load contains – apart from the load weight – the weight of the main boom extension in transport position, the weight of the hook block, the hoist rope and all load handling devices. The net load is the actual load on the hook block without the load handling devices. Display faults are possible due to external factors, such as wind which effects crane and load.

The load may only be raised with the hoist. It is forbidden to raise the load by extending the telescopes or luffing cylinders.



Bridging the Load Limit Device

Bridging the Shut-off of the Load Moment Reducing Movement "Raise Luffing Gear"

In case of overload, the load-moment-reducing movement „raise luffing gear" of the load limit device is also shut down.

After the overload state has been switched off by a load limit device, the load moment reducing movement can be driven in order to take a hanging load from the overload range into the normal working range. The release to "raise luffing gear" is carried out via the key button (**44**). **To do so, the key must be** turned clockwise and held in this position.

The indicator light (**43**) **lights up in the bridged state.**

Release of this load moment reducing movement can only occur if it does not create a dangerous situation.

The load is too heavy if it still has contact with the ground and "raise hoist" has been switched off. The movement "raise luffing gear" may not be released in this case!

Under no circumstances may "raise luffing gear" may be used to raise the load!

Bridging the Shut-Down of all Movements

The load limit device can be bridged using the key button (**40**).

To do so, the key must be turned clockwise and held in this position.

The indicator light (**39**) **lights up in the bridged state.**

The load limit device may only be bridged in exceptional cases, e.g. repairs, putting on a rope, or similar activities.

It may only be done by authorized persons who are acquainted with the operation of the crane!

Under no circumstances may bridging of the load limit device may be used to increase the load moment.

It is forbidden to raise a load with a bridged load limit device!

Limit Switches

Bridging the Hoist Limit Switch

A hoist limit switch is triggered when the red hoist limit symbol (**HES**) **lights up. The alarm sensor sounds.**

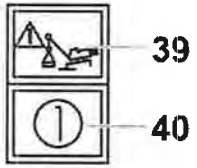
The hoist limit switch "hoist 1 or 2 – raise" is bridged with the key button (**42**).

The indicator light (**41**) **must light up when the limit switch is** bridged.

The limit switch may only be bridged in exceptional cases, e.g. when configuring the crane (fitting or changing of device components, putting on ropes, etc.).

Lower Limit Switch

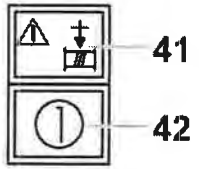
When the red lower limit symbol (**SES**) **lights up the relevant** lower limit switch is triggered.



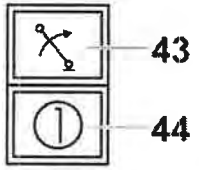
The lower limit switches may be bridged
hanging or putting on ropes.

e operation with bridged limit
:hes is forbidden.

OF ACCIDENTS!



proximity switch on the slip ring of
oist drum must be bridged in order to
it switch.



Click for interactive IC-1

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NOTES;