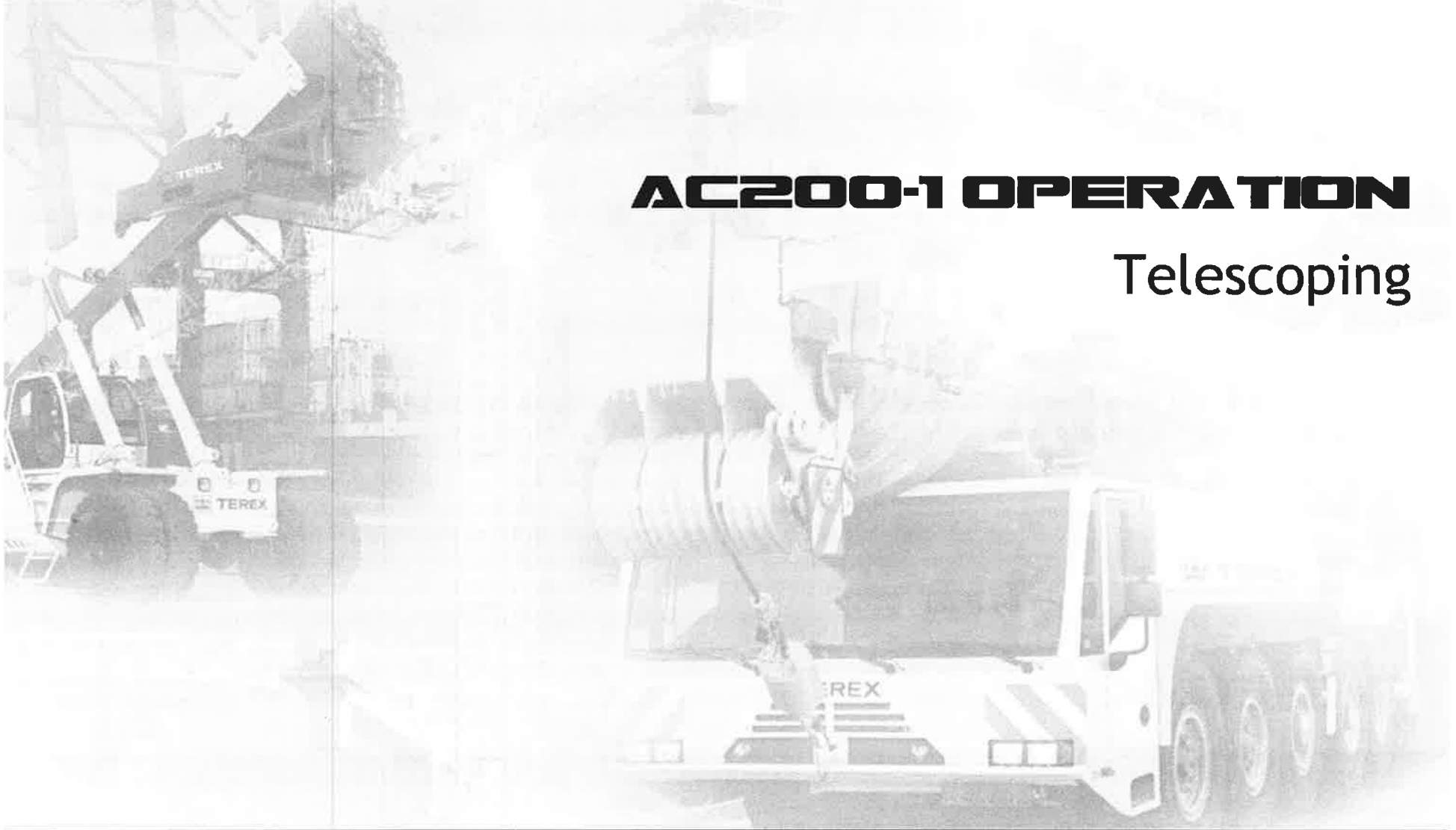




**GLOBAL CRANE TRAINING**



# **AC200-1 OPERATION**

## Telescoping

# Telescoping Content



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## Telescoping

### General

The main boom is made up of a basic case and 6 telescopic sections (inner sections).

When completely telescoped in, the main boom length is 12.4 m, when completely telescoped out 67.8 m. Normally, all telescopes are **pinned with these and all other permissible operating lengths**.

That means that each boom section is secured with the next largest boom section on the left and right at the rear with two pins (**3**).

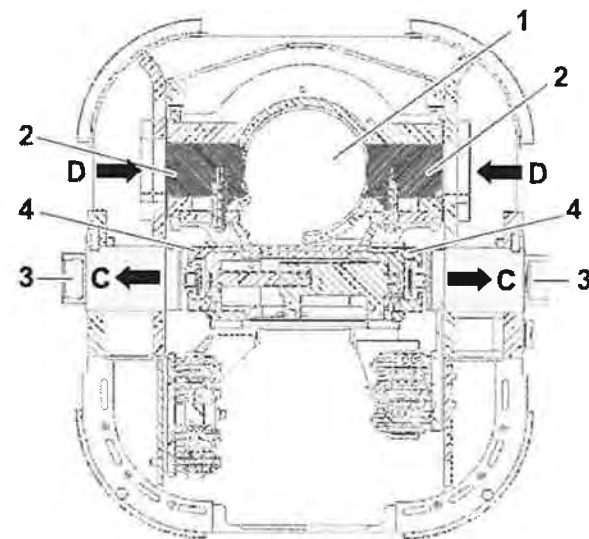
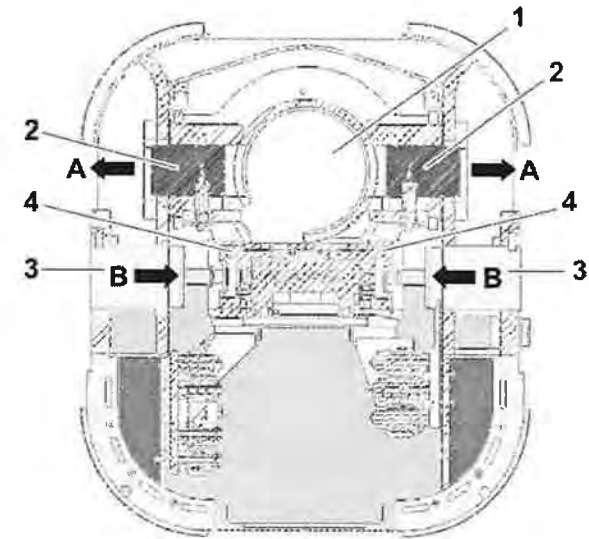
All 6 telescopic sections are telescoped in and out using the following elements:

- a telescoping cylinder (**1**), which is fastened to the back of the basic case.
- a locking and pinning unit (LPU), which is connected to the tip of the piston rod of the telescoping cylinder using a tie frame. This is therefore moved accordingly as soon as the telescoping cylinder is driven.
- the LPU is activated via two hydraulic cylinders.

All necessary steps are shown to the crane operator on the telescoping information system.

“Telescoping” refers to both the extension and retraction of the telescoping cylinder. A differentiation is made between two different cases:

- A telescopic section (boom inner section) is not locked on the locking and pinning unit. The locking and pinning unit is moved “empty”.
- A telescopic section (boom inner section) is locked on the locking and pinning unit. The telescopic / boom section is moved also. This is the actual “telescoping”.



Before each telescoping procedure, all telescopic sections must be pinned and unlocked. The corresponding telescopic section is then locked and unpinned.

After each telescoping procedure, the individual telescopic section is pinned and unlocked, before the next telescopic section is telescoped out.

**If the main boom has been extended or retracted to its final operating length and pinned, the locking and pinning unit must be completely retracted. Otherwise, the max. indicated load capacities would not be achieved.**

The telescoping procedure is only ended once the LPU is completely retracted again. Only then are the max. lifting capacities enabled for the selected length code. The button of the length code is marked green.

Below, the procedure for telescoping the main boom **without** load on the hook is describe.

### Locking and Pinning Unit

The locking and pinning unit is connected to the tip of the piston rod of the telescoping cylinder using a draw bar and is therefore moved accordingly as soon as the telescoping cylinder is driven.

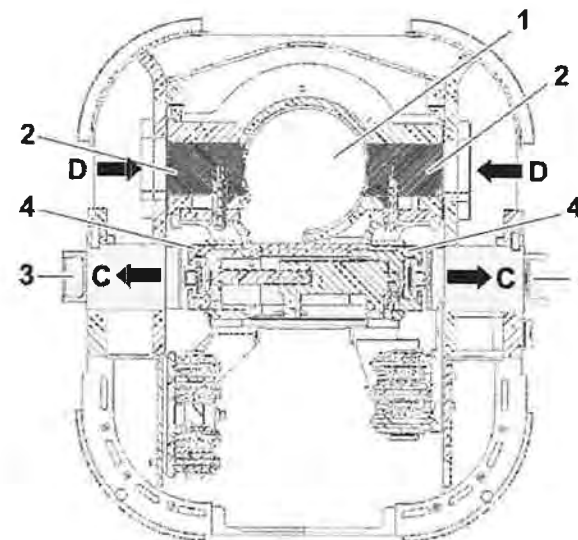
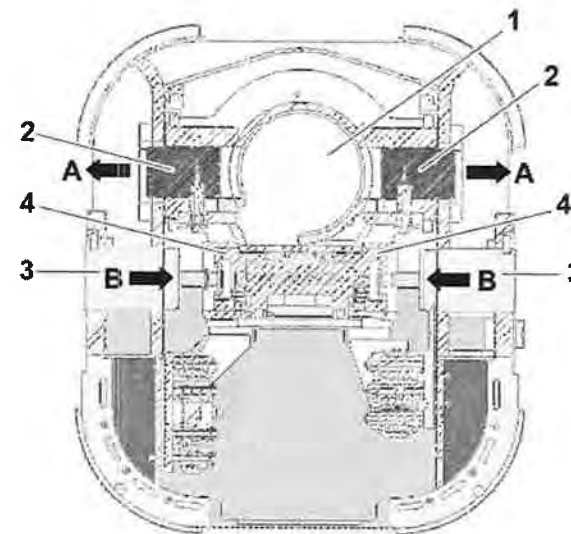
On the locking and pinning unit, the selected procedure is carried out which consists of two interconnected processes:

- Locking and unpinning
- Pinning and unlocking

*The locking and pinning unit is designed in such a way that, once the corresponding movement has been initiated, the system always locks (or pins) before the following action of unpinning (or unlocking) can be activated.*

*This ensures that the system is never in an unsafe condition (unpinned and unlocked at the same time).*

All telescopes can be pinned at **0% / 45% / 90 % and 100%**.




### Supply of the LPU with hydraulic oil

Supply of the LPU with hydraulic oil is done through the telescoping cylinder with an internal oil conduit. A hydraulic accumulator is needed to do this. This accumulator should always be within a pressure range of 65 – 85 bar (943 – 1233 psi).

The pressure display is shown at (3) in the display "TeleManual". This can be activated in the following way:

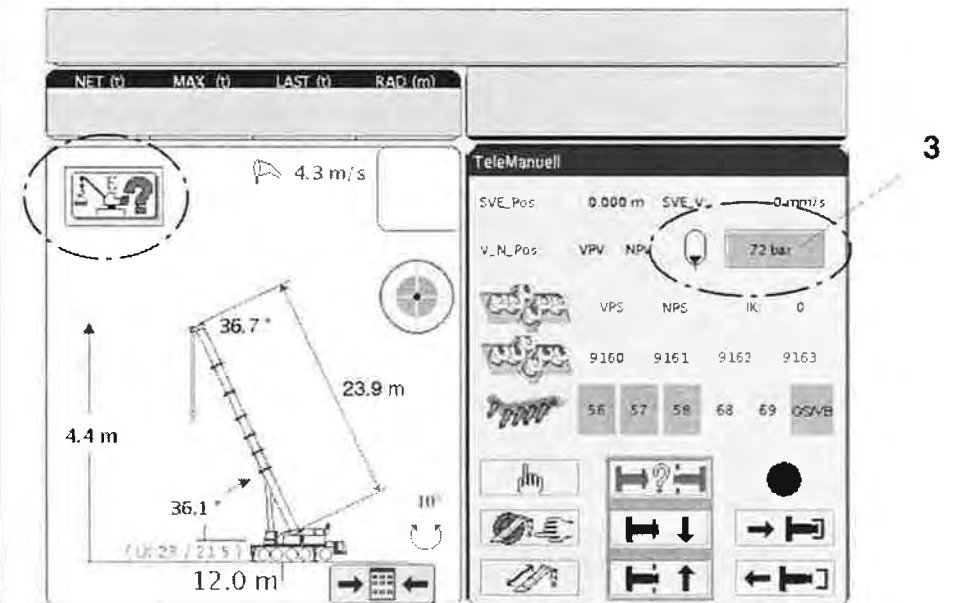
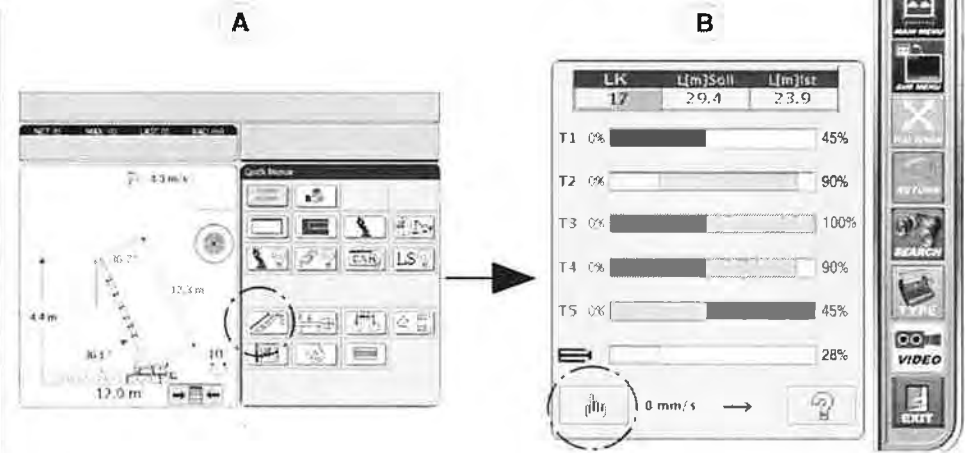
On the screen "Quick Menu" press the key. 

The input screen of the telescoping information system, the "telescoping display", appears instead of the "Quick Menu". Press the button there. 

If the pressure in the accumulator falls below 76 bar (1100 psi), normally the loading procedure is started automatically.

The loading procedure is not carried out if:

1. the pressure in the accumulator is >86 bar (1247 psi)
2. the telescopic cylinder is retracted
3. the LPU is in the state "locked / unpinned" and the telescopic cylinder is not telescoped (unpinned loads)
4. the LPU is in the state "unlocked / pinned", the telescopic cylinder is not telescoped and the entire telescoping drive is telescoped out less than 1.5 m (4.9 ft)
5. the LPU is in the approach position, fine position or follow-up position during the locking and pinning procedure.



If the pressure sensor malfunctions, the fault symbol appears



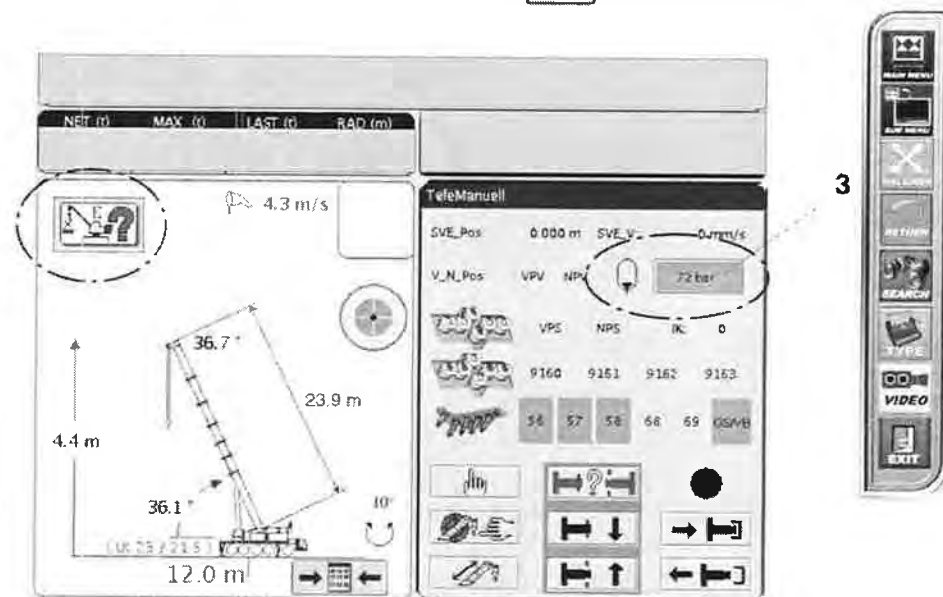
on the left side of the IC-1 display. When the fault message is called up, the fault code no. "E:325" appears.



Then the accumulator pressure has to be manually brought into the normal range of 65 – 85 bar (943 – 1233 psi). The button next to the accumulator symbol has to be pushed to do this.

The button is left green when the pressure is within the normal range and is left red when the pressure is NOT within the normal range.

During the loading procedure – a maximum of 15 s – the button is yellow.





## Telescoping

### General

There are two possible operating modes for telescoping the main boom:

#### – Automatic telescoping;

As long as there is no fault, telescoping must **always be carried out** in automatic operation.

Automatic telescoping is carried out with the help of the telescoping information system.

**The telescoping information system is an aid to operation.**

**It is not a replacement in any way for the judgment and experience of the crane operator as well as recognized safe operating procedures for the operation of cranes.**

**When using the operating aid, the crane operator still remains fully responsible for the safe operation of the crane.**

**He must ensure that he fully understands and follows the notes and instructions in their entirety. The system can only be guaranteed to work correctly if it is checked daily and used in accordance with the operating instructions.**

#### – Manual telescoping;

Manual telescoping is done without monitoring by the load limit device, which is why it is only permitted **in exceptional cases** :


- when the automatic telescoping system is not working (e.g., fault with a sensor)
- to achieve lengths for which there is no length code (e.g., when greasing the main boom).


## Telescoping Procedure


Proceed in the following manner when telescoping:

1. Support and align the crane on outriggers in accordance with the regulations see operating instructions of the crane chassis.

2. Start the superstructure engine.

3. Enter the operating mode. Press the button there. 

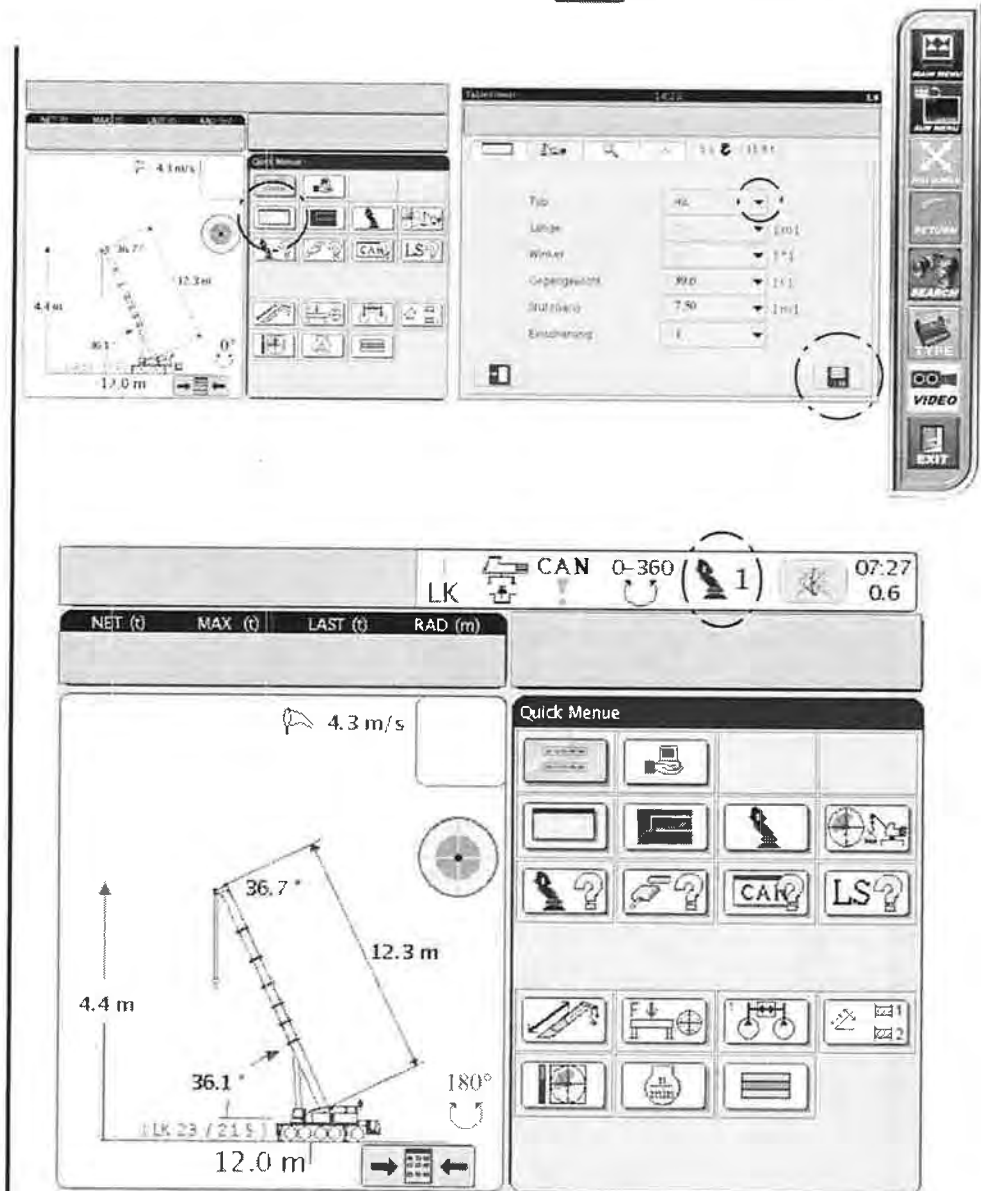
The screen for preselecting the operating mode appears. Make a selection of all relevant fields in accordance with the actual state of the crane (e.g. "type" here: main boom) and exit the screen via .

4. Check which mode has been selected for the assignment of the control levers. The current mode (here: 1) is displayed by the corresponding symbol  1 in the top line of the IC-1 display.

## RISK OF ACCIDENTS

**It is the crane operator's responsibility to check the current control lever assignment before initiating a crane movement.**

**Otherwise there is risk of accidents if accidental crane movements are triggered.**









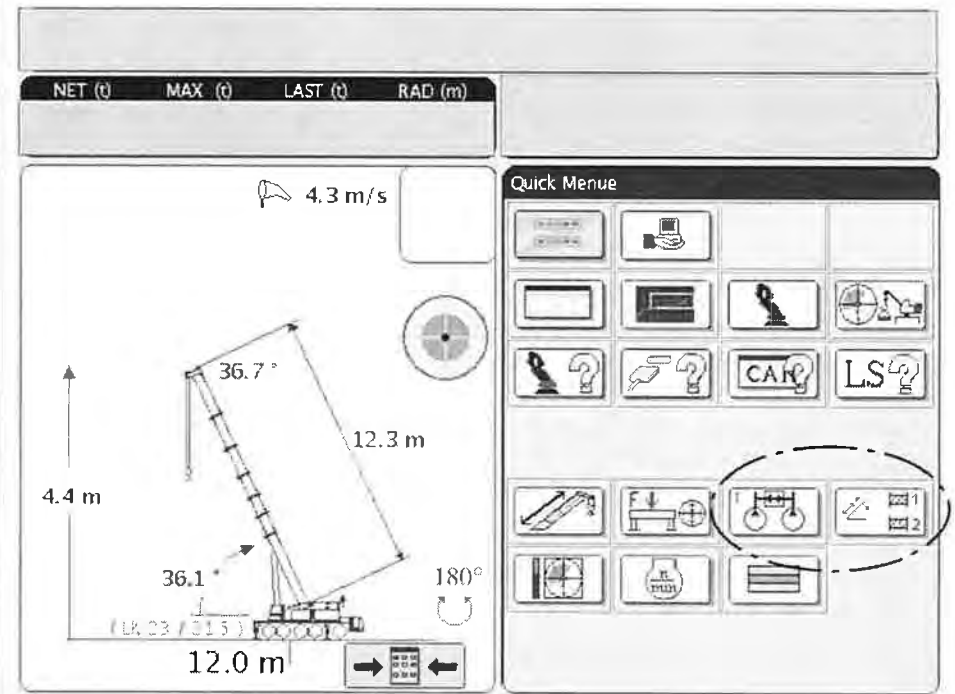
5. Select the operating mode of the hydraulic pumps.

The hydraulic pumps can be connected so that they supply all hydraulic functions together.

The pumps can be separated for improved control.

To do so, press the left-hand   key. The selected mode “1 – 4” is displayed in the top left-hand corner in the key field. Then the movements of the assigned pumps are displayed in the two keys  

*The key displays change according to the mode selection.*



6. Start telescoping by pressing one of the buttons (32/36) “dead man’s control” and carefully moving the corresponding control lever (16/24):

	Automatic telescoping	Manual telescoping
Activate control lever (16/24) forwards / to the right	after entering the LK (length code) of the preselected process	Telescoping Out
Control lever 916/24) back-wards / to the left	Activate LK 1 (length code 1) and activate complete telescoping in of the main boom	Telescoping In

**You must take the current position of the control levers into consideration.**

In order to prevent accidental initiation of crane movements, both control levers are equipped with an additional key (dead man’s control). Only when one of the buttons is pressed is it possible to carry out a crane movement.

You may only activate (press or release) a dead man’s switch if the corresponding control lever is in the neutral position and/or the initiated working movement has been completed.

**RISK OF ACCIDENTS**

**Pressing/releasing one of these dead man’s switches when the control lever is fully engaged causes abrupt initiation/braking of the corresponding movement.**

**RISK OF ACCIDENTS**

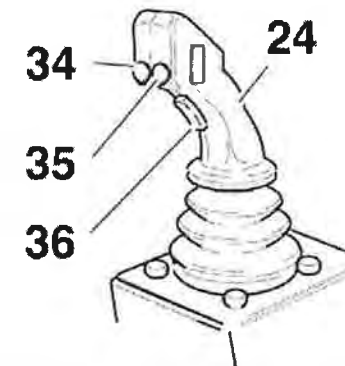
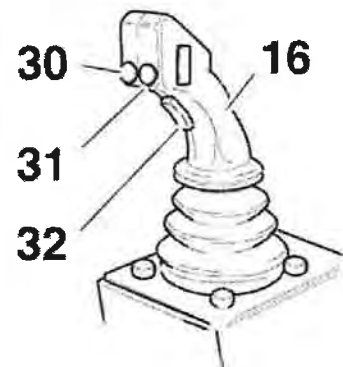
**Only by adapting the acceleration or speeds of all crane movements can you avoid that the load or the hook block swings out, causing risk of crushing or crashing when each movement is switched off.**

**Control levers (16/24) may not be switched directly to the opposite direction, but must first remain in the neutral position.**


**Only initiate the opposite movement once the movement has come to a standstill.**

*The control lever automatically returns to the zero position once released. The current crane movement is stopped.*

*If the hook is raised, and if the hoist limit switch has triggered, the main boom can no longer be extended. First the hoist (the hook) must be lowered.*



## Telescoping display

On the screen "Quick Menu" press the key .

The input screen of the telescoping information system, the "telescoping display", appears instead of the "Quick Menu".

This is where submenus can be selected and information on the status of the telescoping system can be found:

**(1) Entering the length code** see "Selection of the length code" **code**

Grey: The selected length code **has not** been achieved.

Green: The selected length code **has** been achieved.

**(2) Final length of the main boom**

**(3) Actual length of the main boom**

LK	L[m]Soil	L[m]lst
17	29.4	23.9

T1 0% 45%

T2 0% 90%

T3 0% 100%

T4 0% 90%

T5 0% 45%

28%

0 mm/s

#### (4) Changes to the display of the tele aid

Electrical limit switches are fitted on the LPU and on the drive unit of the LPU:

**B 9160 – B 9163**

used to recognize the telescopic section ("D"). The corresponding digit after the designation "tele" indicates which boom section is being dealt with.

Example: 1st boom section; description "Tele 1":

As shown, both lamps are illuminated, which symbolize the limit switches **B 9160** and **B 9161**.

**B 9164 – B 9165**

show the position of the LPU to the telescopic section.

When both light up, the LPU can lock the affected telescopic section, i.e., create the connection to the section.

**B 9156, B 9157, B 9158, B 9168, B 9169**

show the status of the LPU.

"A": pinned / unlocked

"B": pinned / locked

"C": unpinned / locked

#### (5) Display of the current condition of the telescopic cylinder and/or of the LPU

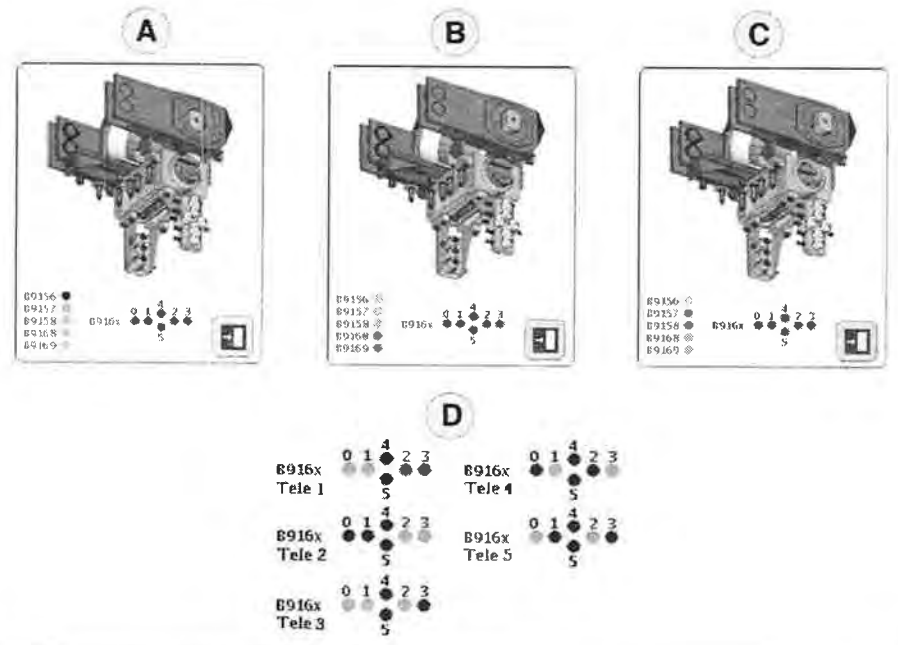
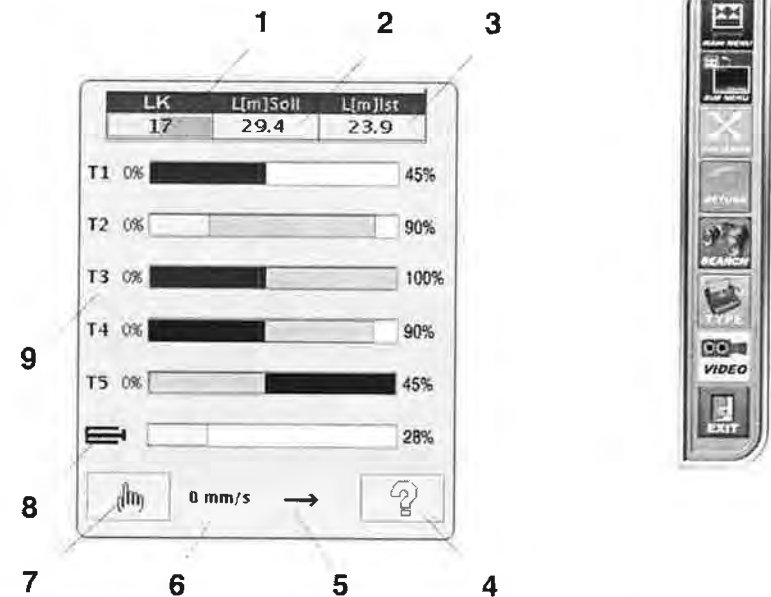
→/← forwards / backwards with reduced speed

→>/←> forwards / backwards with high speed

↑/∧ Telescopic section pinned / unpinned

↔/> LPU locked / unlocked  
● Point black: telescoping system stop

● Point red: fault in the telescoping system.



**(6) Telescoping speed display of main boom / telescoping cylinder**

Just before the pinning position is reached, the telescoping speed is reduced, so that the telescopic sections can be pinned.

**(7) Switches to the “TeleManual” screen**

**(8) LPU position display**

**(9) Extension length for a telescopic section in percent**  
 telescopic section blue: these telescopic sections are already

extended to the selected length code

telescopic section grey: these telescopic sections are retracted and yet to be extended

telescopic section black: in combination with **grey background:**

this telescopic section must be retracted or the new LK (length code), and extended again later

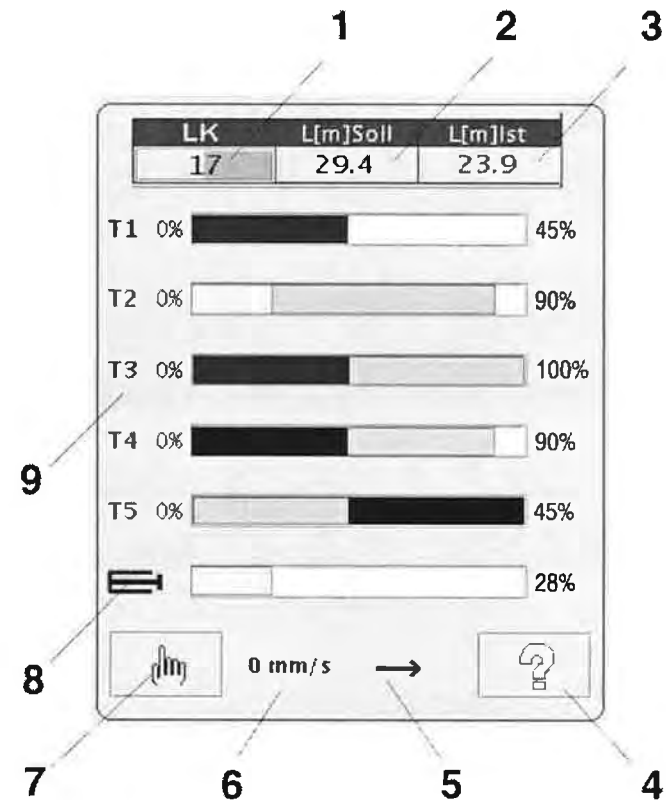
in combination with **white background:**

this telescopic section must be retracted for the new LK (length code)

telescopic section this telescopic section extends or yellow: retracts with the LPU

telescopic section white: these telescopic sections are retracted

telescopic section this telescopic section’s position is orange: reached




## Length code

### Selection of length code

In order to select the length code (LK) for the desired main boom length, press "LK" button. The "Tele operation mode" screen appears.

Here, all length codes are displayed that can be selected and that are compatible with the selected operating mode, including main boom length, extension configuration for the individual telescopes and possible max. lifting capacities.

Press to select the desired length code (entire line 1, is touch sensitive). By pressing the button, 

the length code is saved and you exit the screen. Now the "Telescoping display" screen appears.

screen appears.

The "LK" button with the newly selected length code now has a grey background. <This means that the corresponding length has not yet been reached. This LK code is also displayed in black in the topmost line of the IC-1 display.

As soon as the following telescoping procedure has been completed and thus the appropriate target length reached, **both displays** change their color to **green**.

The top screenshot shows the 'Tele operation mode' screen. At the top, it displays 'HA 39.0 t 7.50 m 1 LK CAN 0-360 1 15:11 0.64'. Below this, a table shows 'NET (t) 2.8', 'MAX (t) 13.0', 'LAST (t) 2.8', and 'RAD (m) 12.0'. A large '21%' is displayed on the right. The main area features a crane diagram with dimensions: 4.4 m height, 12.0 m radius, 23.9 m boom length, and 36.7° boom angle. A speed indicator shows '4.3 m/s'. On the right, a table lists telescopes T1 to T5 with their respective percentages: T1 0% (45%), T2 0% (90%), T3 0% (100%), T4 0% (90%), T5 0% (45%), and a bottom bar at 28%. A '0 mm/s' indicator and a help icon are at the bottom right.

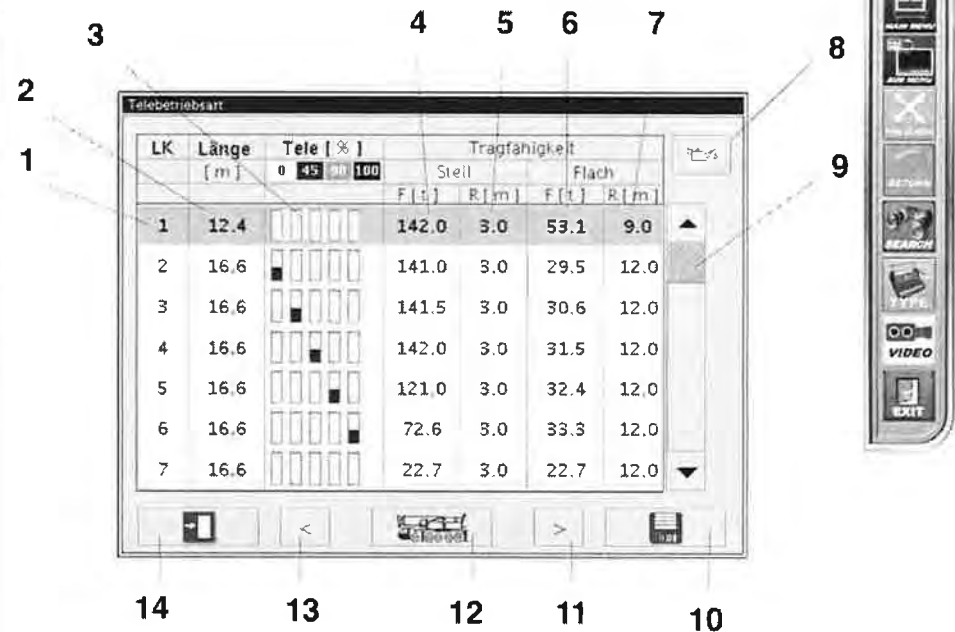
The bottom screenshot shows the 'Telescoping display' screen. It has a title 'Telebetriebsart' and a table with columns: 'LK', 'Länge [m]', 'Tele [%]' (with a sub-table for 0, 45, 90, 100), and 'Tragfähigkeit' (with sub-tables for 'Steil' and 'Flach'). The 'Steil' sub-table has columns 'F [t]' and 'R [m]', and the 'Flach' sub-table has columns 'F [t]' and 'R [m]'. The table lists LK codes 36 to 42. LK 36 is highlighted in black. A vertical scrollbar is on the right. At the bottom, there are navigation buttons and a 'TEST' button.

### “Tele operating mode” screen

- (1) – Length code number (LK No.)
- (2) – Main boom length
- (3) – Extension configuration of telescopes 1 to 5 (from left to right)



- (4) – Max. lifting capacity in high position
- (5) – Radius in high position
- (6) – Max. lifting capacity in low position
- (7) – Radius in low position
- (8) – Activation of the mask for selection of the length code for lubrication of the main boom (only for operating mode HA)
- (9) – Scrollbar for browsing through the length codes, line by line
- (10) – Exit the mask with save; the settings are assumed
- (11) – Leafing through the length code, page by page:  
> one page down;
- (12) – Length code selection for the LPU position for moving the crane (only for operation mode HA)
- (13) – Leafing through the length code, page by page:  
< one page up
- (14) – Exit the mask without save; the settings are not assumed





The screenshot shows a table with the following data:

LK	Länge [m]	Tele [%]	Tragfähigkeit			
			Steil		Flach	
			F [t]	R [m]	F [t]	R [m]
1	12.4	0 45 100	142.0	3.0	53.1	9.0
2	16.6		141.0	3.0	29.5	12.0
3	16.6		141.5	3.0	30.6	12.0
4	16.6		142.0	3.0	31.5	12.0
5	16.6		121.0	3.0	32.4	12.0
6	16.6		72.6	3.0	33.3	12.0
7	16.6		22.7	3.0	22.7	12.0

## Selection of the Length Code for Lubrication of the Main Boom

In order to select the length code (LK) for lubrication of the main boom, the crane must be switched to operating mode 'HA' ('main boom operation').

In the mask 'Tele operating mode', the 'lubrication symbol' is displayed at the marked place. 

By selecting the lubrication symbol  mask is displayed with the selection list of the corresponding length code.

Instead of displayed the details on load capacities and radius, the values for counterweight combination and outrigger support area are indicated, which must be fulfilled **at the very least**:

(17) – minimum counterweight


(18) – minimum outrigger support area

(19) – key: back to the mask "Tele operating mode"

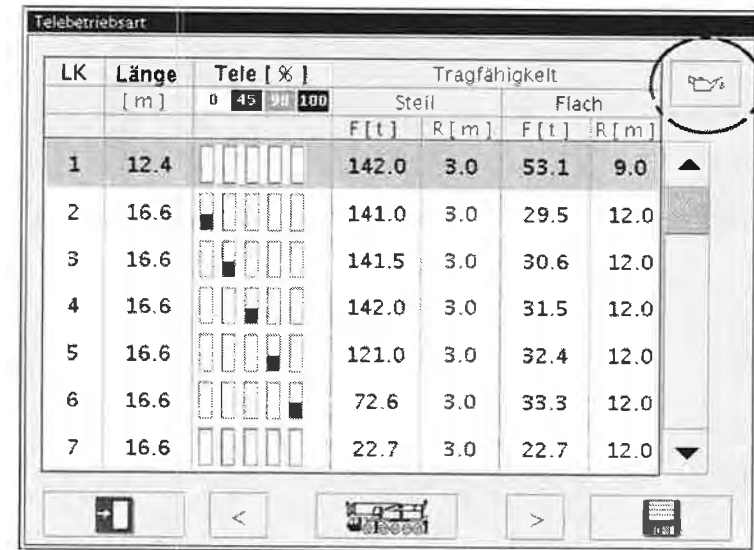
### Risk of tipping!

**Only when the actual crane configuration fulfils the minimum requirements for counterweight combination and outrigger support area is it ensured that lubrication of the main boom is risk free.**

**You will find the actual lubrication procedure in the maintenance and lubrication instructions of the superstructure.**

After activating the corresponding length code for lubrication of the main boom, you can exit the mask with 'Save'. 

If the configuration of the crane currently reserved in control does not fulfill the indicated minimum requirements for counterweight and outrigger support area, the relevant value will be displayed in red. The mask then **cannot be exited with 'Save'**.

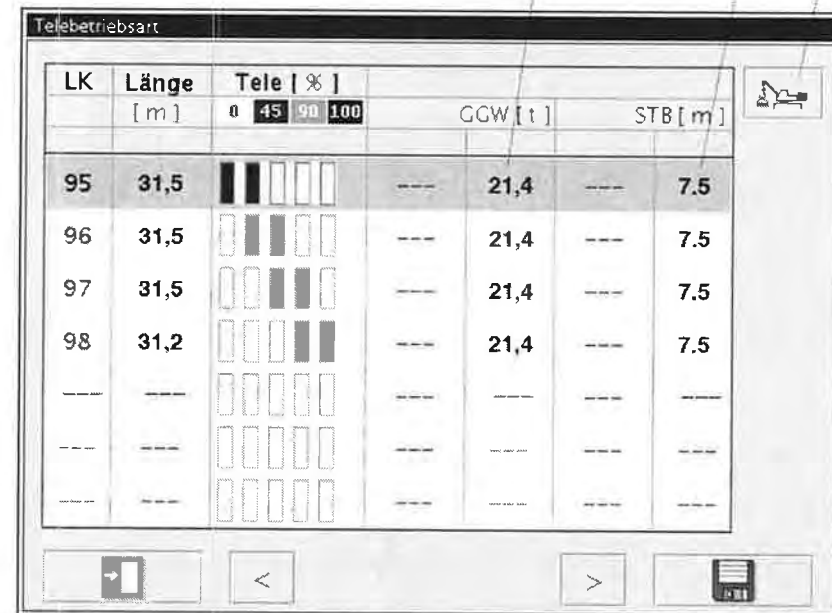


LK	Länge [m]	Tele [%]	Tragfähigkeit			
			Steil		Flach	
			F[t]	R[m]	F[t]	R[m]
1	12.4	0 45 90 100	142.0	3.0	53.1	9.0
2	16.6	0 45 90 100	141.0	3.0	29.5	12.0
3	16.6	0 45 90 100	141.5	3.0	30.6	12.0
4	16.6	0 45 90 100	142.0	3.0	31.5	12.0
5	16.6	0 45 90 100	121.0	3.0	32.4	12.0
6	16.6	0 45 90 100	72.6	3.0	33.3	12.0
7	16.6	0 45 90 100	22.7	3.0	22.7	12.0

17

18

19



LK	Länge [m]	Tele [%]	GCW [t]		STB [m]	
95	31,5	0 45 90 100	---	21,4	---	7,5
96	31,5	0 45 90 100	---	21,4	---	7,5
97	31,5	0 45 90 100	---	21,4	---	7,5
98	31,2	0 45 90 100	---	21,4	---	7,5
---	---	0 45 90 100	---	---	---	---
---	---	0 45 90 100	---	---	---	---
---	---	0 45 90 100	---	---	---	---



### Automatic telescoping

The IC-1 enables automatic telescoping, after selecting the required final length (by entering the corresponding length code "LK"), by operating the corresponding control lever.

This means that if the boom is to be extracted to a new length, the corresponding control lever must be moved explicitly in extending direction and held (when selecting an operating mode with which telescoping is possible).

*This is also the case, if the new main boom length is less than the current length.*

*If the control lever is moved to retracting direction, then LK 1 (all telescopes 0%) is activated and the automatic system begins to retract the main boom entirely.*

*The telescoping speed varies throughout the procedure.*

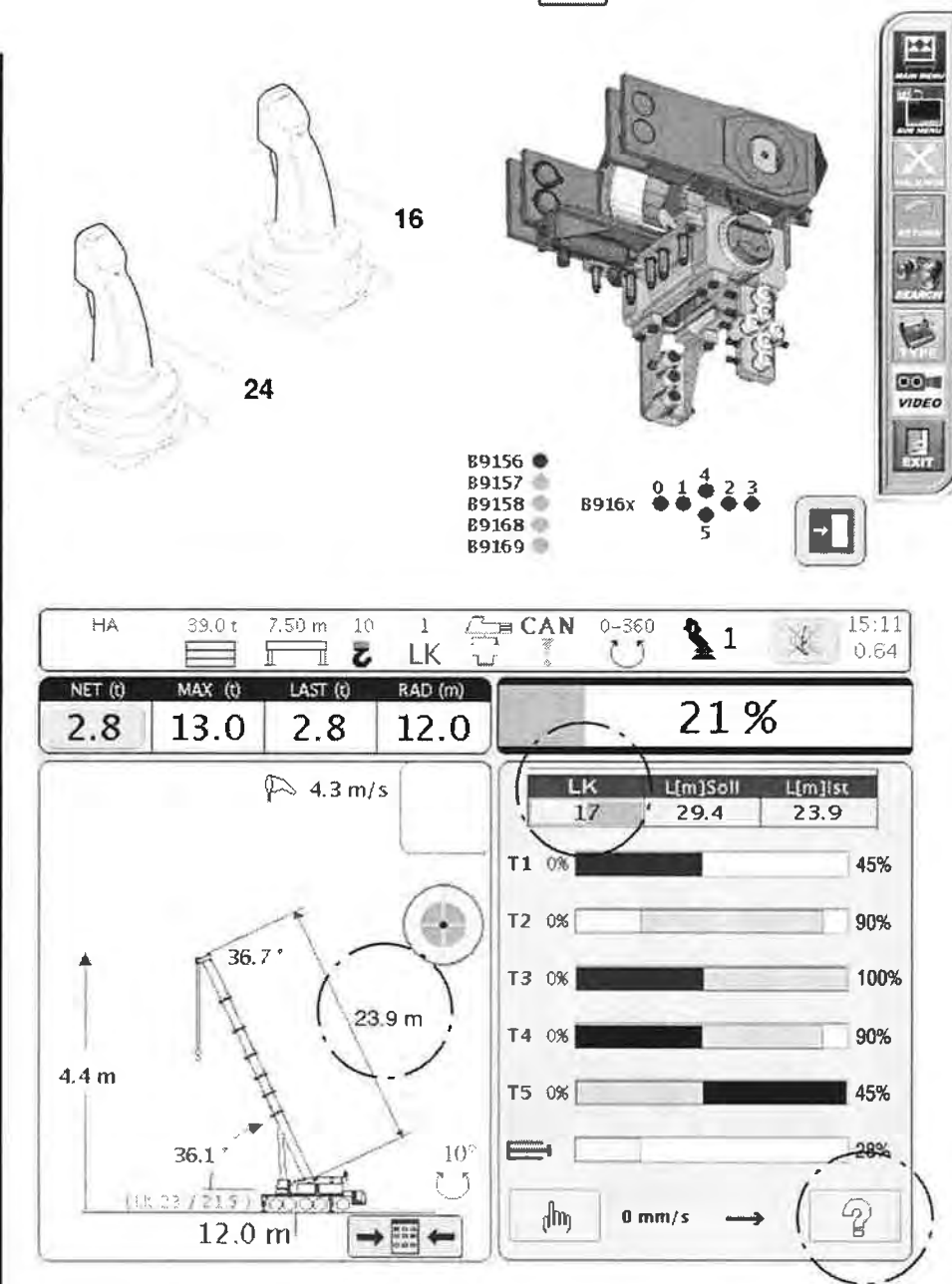
Just before the pinning position is reached, the telescoping speed is reduced, so that the telescopic sections can be pinned.

The telescoping procedure can be observed at the telescope display on the right side of the IC-1 display. As soon as the desired final length is reached, the color of the "LK" button switches from **grey to green**.

During the telescoping procedure, the current total length of the main boom as well as other geometric data are displayed at the crane symbol to the left of the IC-1 display.

Also, the configuration of sensors and pins for the LPU can be monitored during the telescoping procedure. To do so operate "?" button. The screen (top right corner) appears.

The displayed configuration is unlocked and pinned.



The system uses the ls-values, provided by the length transmitter, to calculate the most advantageous run sequence, by making comparisons with the stored operating programs and other factors.

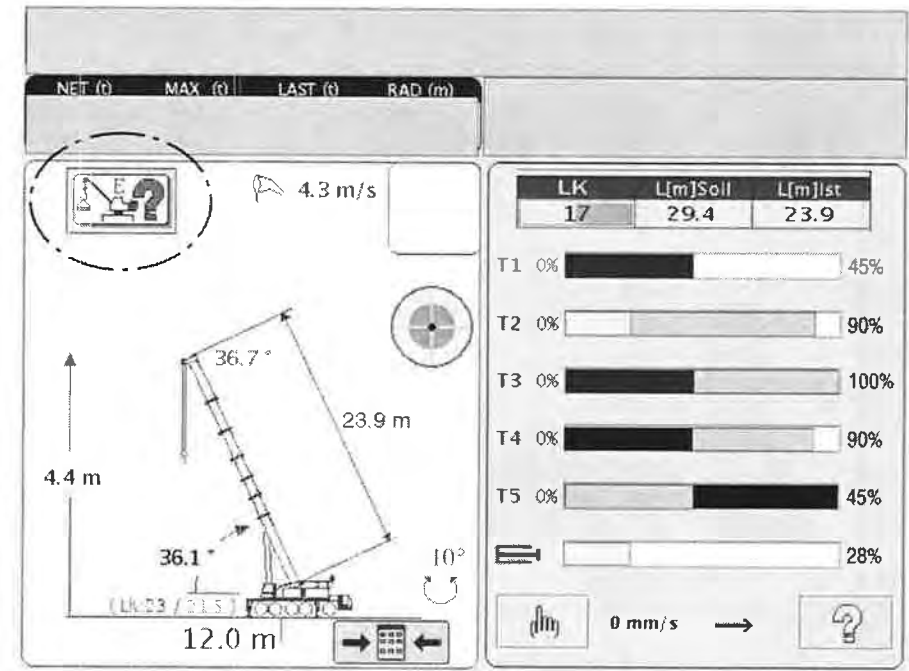
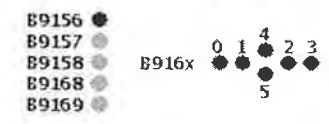
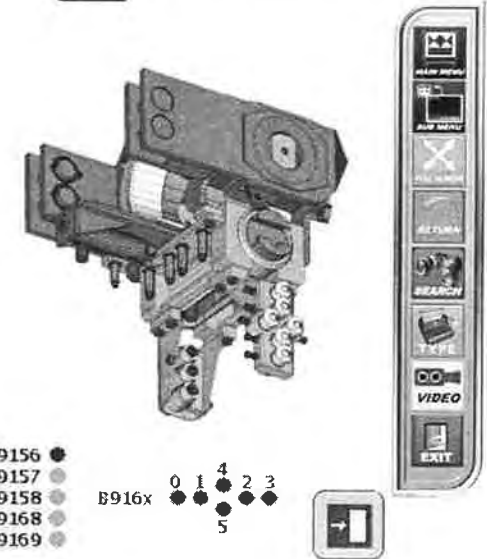
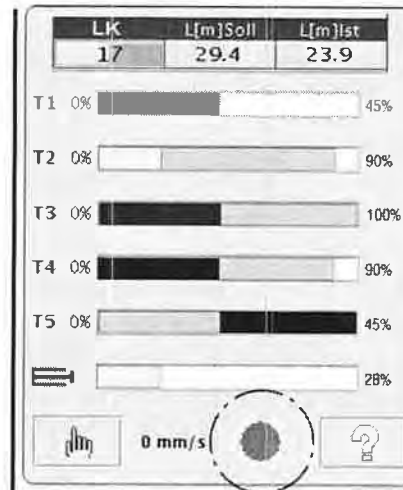
The sequence is displayed using different colored telescopic sections in illustration. Each step required is displayed until the telescoping procedure is completed.

The display of the movement of the individual telescope levels as well as the locking and pinning unit (LPU) and the configuration of the locking and pinning elements is continuously adapted to correspond to the changes made.

*If work has to be stopped, the system automatically saves the values last displayed, so that work can be resumed accordingly.*

**Error routines monitor the correct locking / pinning of the main boom.** System errors are displayed by a red mark (see illustration). At the same time a symbol appears to the left of the IC-1 display. The error must then be identified and eliminate.

After eliminating the error, work can only be continued, once the error message has been acknowledged.



### Manual telescoping

Manual telescoping is carried out without the supervision of the load limit device and is therefore only permitted in **exceptional cases**:

- if the automatic tele system fails (e.g. malfunction of a sensor).
- to achieve lengths for which there is no length code (e.g., when greasing the main boom).

**In manual operation, it is not possible to monitor of the crane via the LMI! Maximum risk of accidents!**

**The crane operator is responsible for any damage or accidents that might be caused in this situation!**

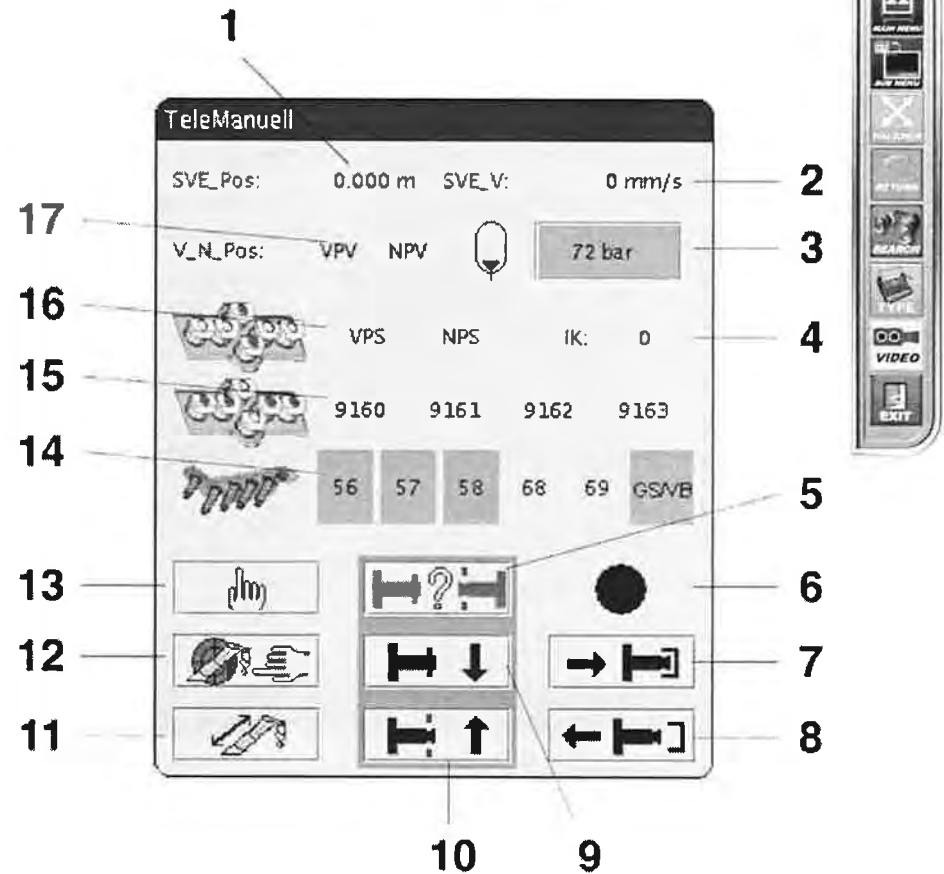
**Under certain circumstances (no monitoring of the crane control during manual telescoping) the telescopic drive can be extended so much that it slides off the inner guide rails.**

**For this reason there is a table with the LPU's approximate locking and pinning positions under sub point**

**"Locking and pinning positions of the telescopic drive" on. The table values correspond with the LPU position (1) in the 'TeleManuell' mask.**

**The corresponding locking and pinning positions may be exceeded by approx. 0.05 m (approx. 0.164 ft) at the most. If the corresponding locking and pinning position is not found, probably several electronic sensors are defective at once. In this case or when the telescopic drive has come off the inner sliding rails please contact our customer services department.**

*If the telescopic drive has come off the inner guiding slides, telescoping is no longer possible. Locking and pinning (or unpinning) the telescopic sections of the main boom is then no longer possible either. The telescopic drive can be extended but will always stick at the same place when being retracted.*



You will find the required information – specially on position and configuration of the LPU – in the "TeleManual" screen. In order to call up the "TeleManual" screen, press the button in the "Quick Menu" screen

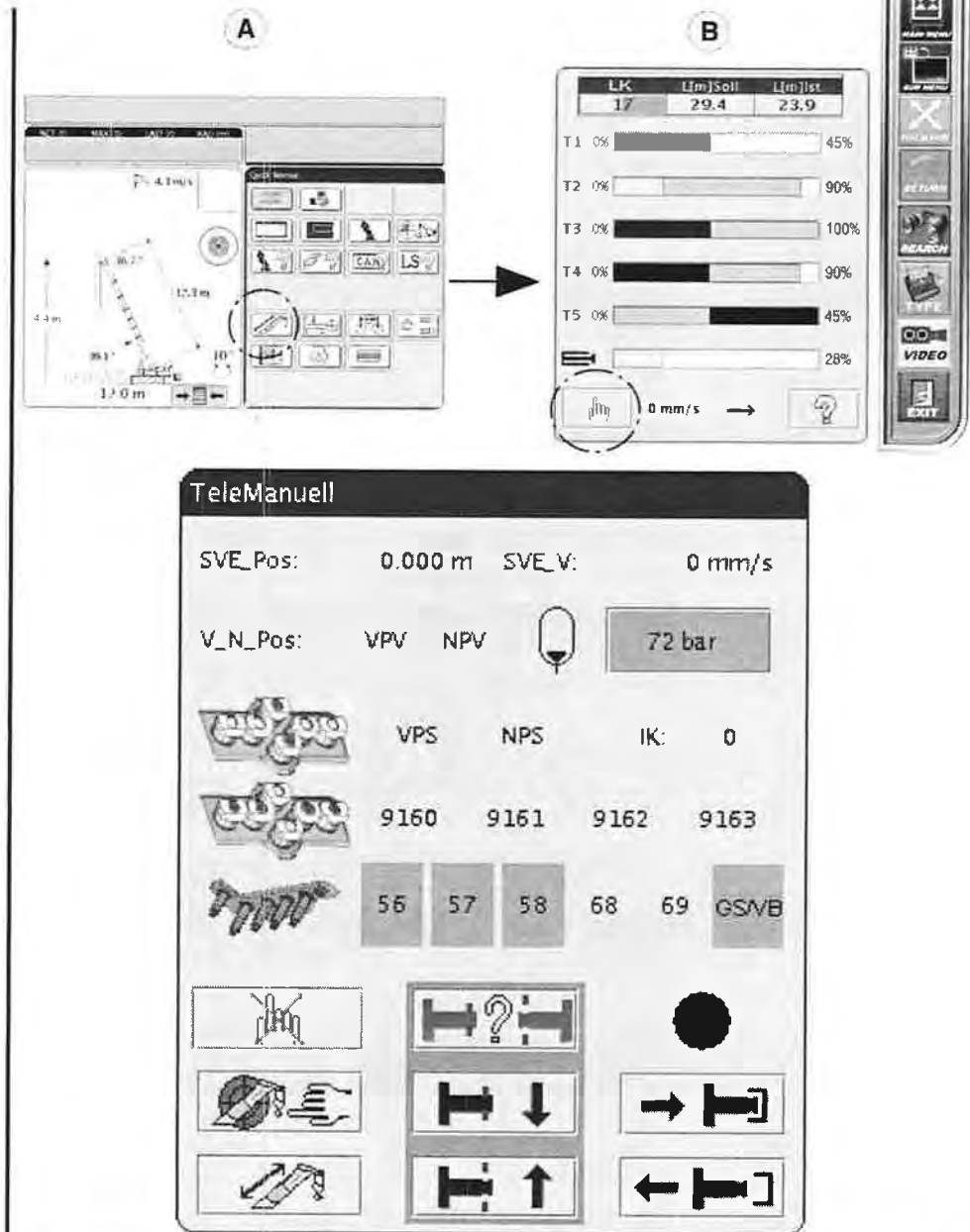
The "Telescoping display" appears in place of the "Quick menu".

Press the button button – the "TeleManual" screen appears.

When the "TeleManual" screen opens, the hand symbol is crossed out.

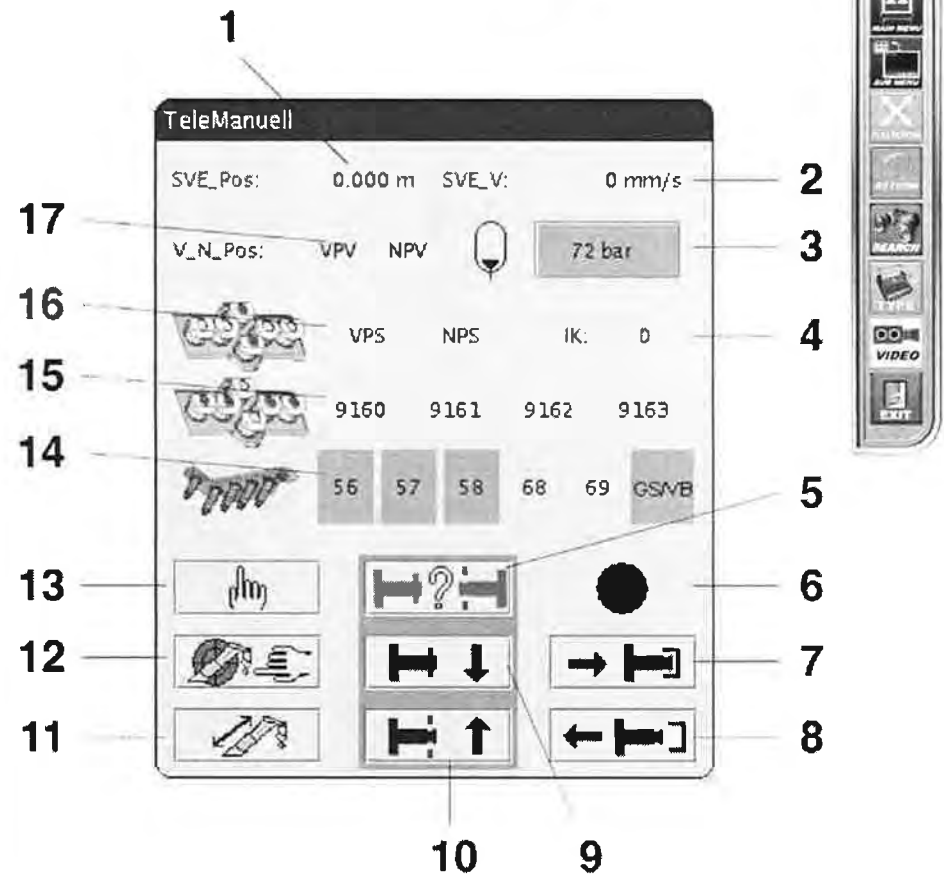
This means that the automatic mode is still active.

One can then take a look at information e.g. on the configuration of the initiators and then return to the original screen.



### “TeleManual” screen

- (1) – LPU position
- (2) – LPU speed
- (3) – Hydraulic supply for LPU
- (4) – Number of the telescopic section, which is connected to the LPU; the depicted no. “0” means that the LPU is not connected to any telescopic section and can be driven “empty” in the basic case.
- (5) – Secure preselection
- (6) – Status display telescoping system
- (7) – Pinning
- (8) – Unpinning
- (9) – Locking
- (10) – Unlocking
- (11) – Back to the telescoping display; is locked after hand operation
- (12) – Teaching (setting and saving) telescope position
- (13) – Switching between automatic (hand symbol crossed out) and manual telescoping operation (hand symbol not crossed out)



(14) – Initiators for the configuration of the LPU (connected initiators are highlighted in red)

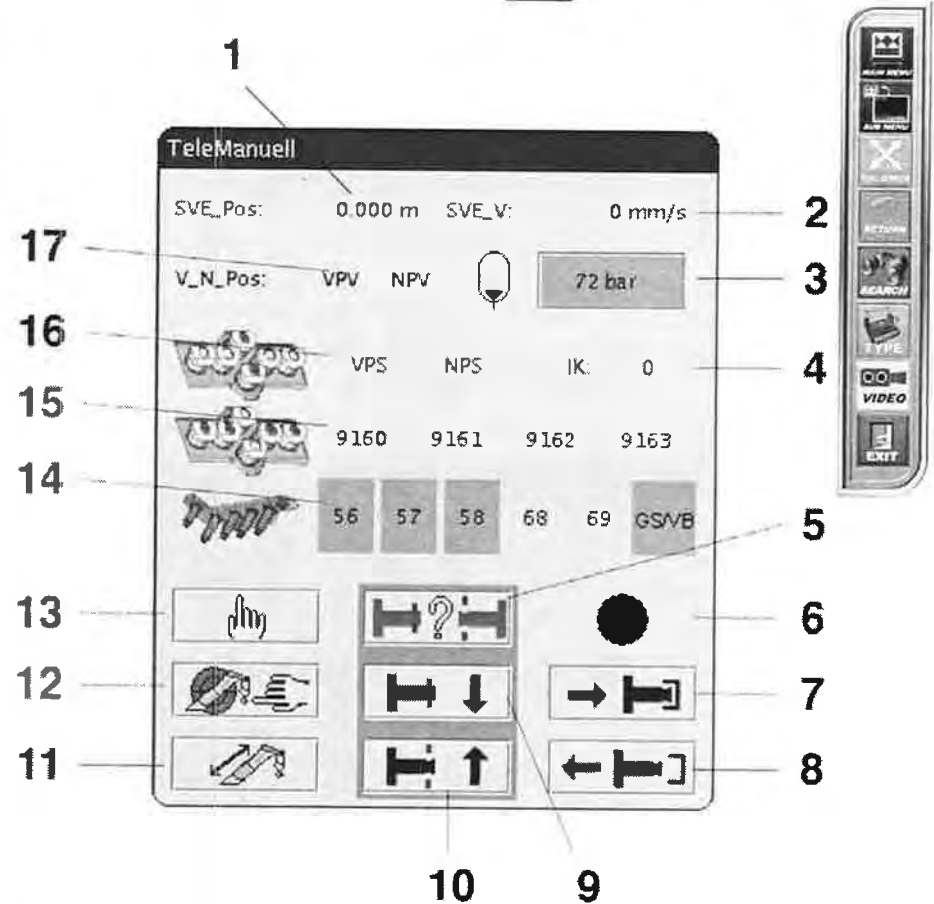
The following states are indicated by letters in German and by a number in brackets in all other languages:

- ES / VB (1) Unlocked / Pinned
- ? / VB (12) Intermediate position
- GS / VB (2) Locked / Pinned
- GS / ? (23) Intermediate position
- GS / EB (3) Locked / Unpinned

(15) – Initiators for the **identification of the telescopes**. The **telescope** currently identified by the LPU is specified at pos. 4 (switched initiators on a red background)

(16) – Initiators for initial and subsequent position for **locking** (switched initiators on a red background)

(17) – Initiators for initial and subsequent position for **pinning** (switched initiators on a red background)



### Manual telescoping procedure

Please make sure you observe the instructions on the permissible employment of manual telescoping and on calling up the "TeleManual" screen.

To activate manual telescoping in the "TeleManual" screen, press the key . It turns into .

### High risk of accidents!

**In manual operation mode it is not possible to monitor the crane with the load limit device. The load limit device must be bypassed.**

**It is only permitted to bypass the load limit device in exceptions!**

**Bypassing must be reversed immediately after manual telescoping!**

**Crane operation with bypassed load limit device is FORBIDDEN!**

To bypass the load limit device, operate the key operated button (112). The corresponding indicator light (111) goes on.

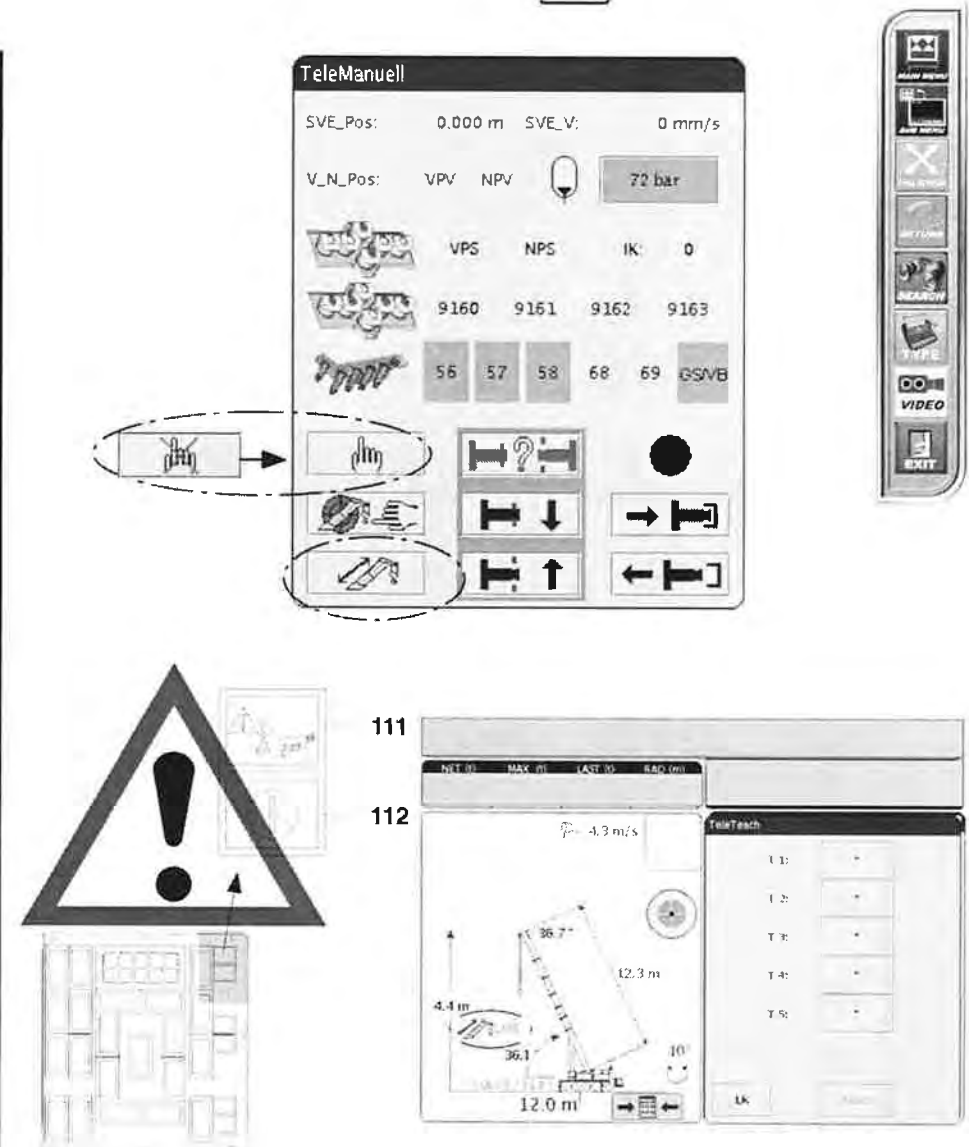
The tele system must be informed about the extension status of the main boom after manually telescoping the main boom. This procedure is called "teaching". The "TeleManual" screen cannot be exited without "teaching".

After the manual telescoping or "teaching" procedure the load limit device can only be operated again and hence be reactivated after passing or reaching a valid length code.

If the telesystem is activated without bypassing the LMI before reaching a valid length code (key ), appears in the crane display symbol.


On principle, the smallest (furthest inward) telescopic section to be telescoped must be started with whenever the main boom is to be extended.

The largest (furthest outward) telescopic section to be telescoped must be started with whenever the main boom is to be retracted.



### Example of manual telescoping (Z 54 133):

The 1st boom section must be driven out of the 100% pinning hole into the 0% pinning hole.

1. Check the “TeleManual” screen, (14, right field), to see whether the LPU is unlocked and pinned (  or digit “1”).

The LPU can be operated in this state using the respective control lever without moving any telescopic section.

This can be seen in the mask “TeleManual” at (2): a speed value  $> 0$  mm/s (ft/min) must then be displayed without the main boom moving.

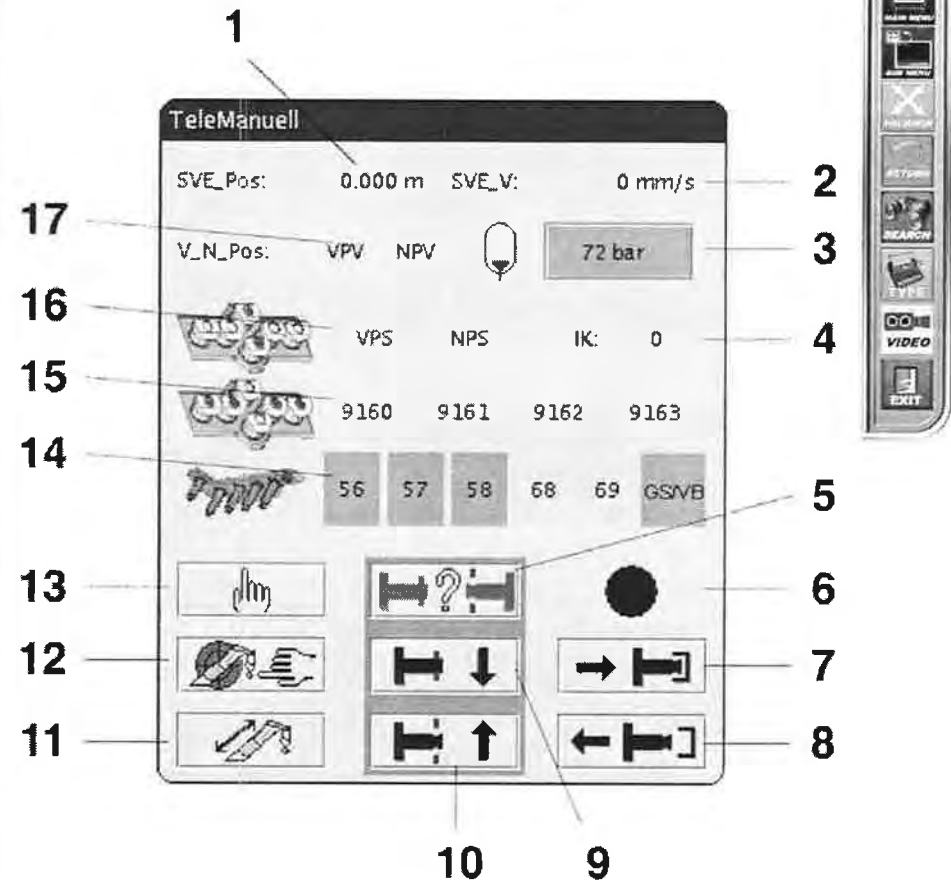
2. Since the LPU has been fully retracted (1, LPU position 0.000 m / ft), it must be “extended” in order to be locked (as desired) to the fully extended first telescopic section.

Steer the respective control lever in order to extend the LPU. The LPU is driven to the 1st boom section.



As soon as the 1st boom section has been reached, the display (4) changes from “IK 0” to “IK 1”.

Then the telescopic drive is telescoped out approx. 9,595 m (31.48 ft) (1st boom section, 100% pinning hole: for further extension lengths of the telescopic drive, see table in section “Locking and pinning positions of the telescopic drive”.

*During the following procedure, telescoping can be interrupted or resumed with the appropriate control lever, depending on which action step is specified.*







3. Interrupt telescoping, then actuate the Preselection key, (5, ) press the lock key (9, ) and slowly continue telescoping.

*The keys are displayed on a red background after actuation.*

*They automatically turn grey again as soon as the selected procedure is over.*


**You must make sure that you follow the correct sequence: first preselection, then locking! The locking process is now automatically actuated when the fine position is approached. In the “Lock” fine position, the two initiators VPS and NPS (16) are active, i. e. on a green background.**

The locking process is over as soon as the locked and pinned state is indicated for the LPU by the symbol  or digit '2' at (14, at the end of the line).

4. The telescopic section must be locked manually if it is unable to be locked automatically. Operate the key (9, )

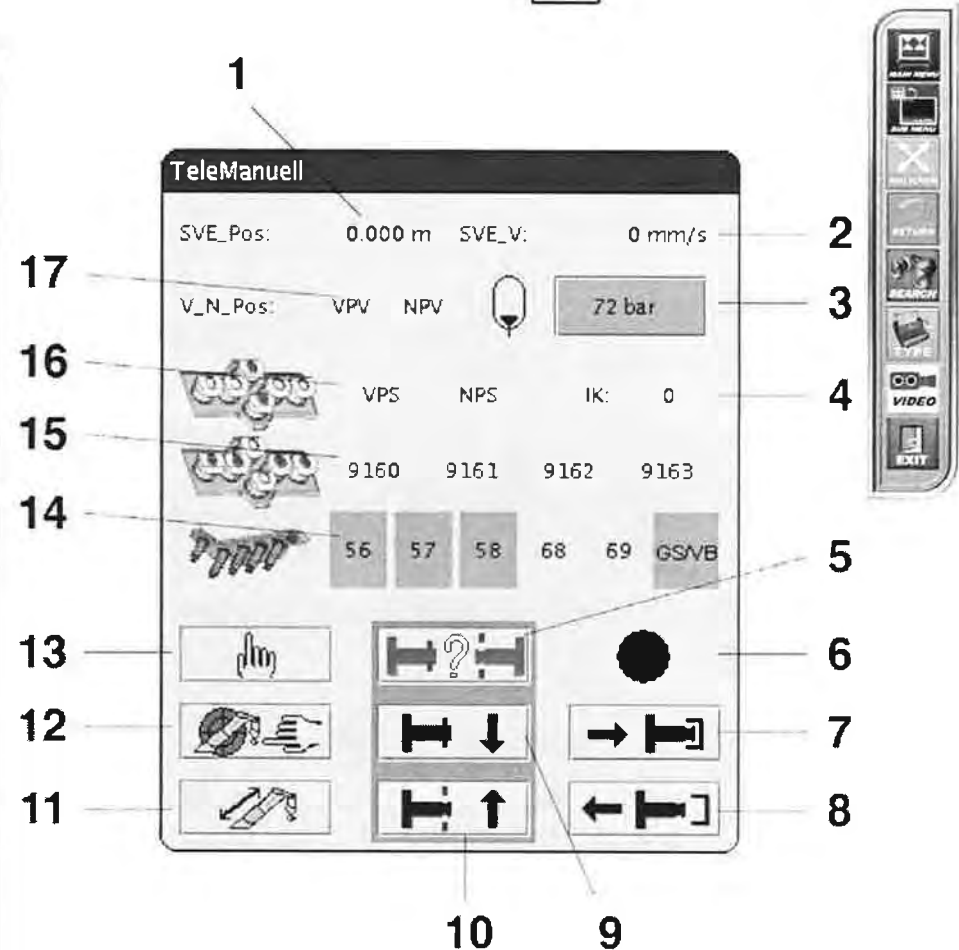
**This key may only be operated in the “Lock” fine position (VPS and NPS “16” active, i. e. on a green background).**

After locking the telescopic section the pinning fine position must be reached, i.e. both initiators NPV and VPV (17) must be on a green background. Only then may the unpinning process begin.


5. To unpin, actuate key (8, )

*The keys are displayed on a red background after actuation.*

*They automatically turn grey again as soon as the selected procedure is over.*



6. Extend the LPU about 1 to 2 cm (0.5 – 1 in) by steering the respective control lever. The unpinning process is then carried out.

The unpinning procedure is over as soon as the locked and unpinned state is indicated for the LPU by the symbol  or digit '3' at (14, at the end of the line).



In this state, the telescopic section is attached to the LPU and can be retracted in the following.

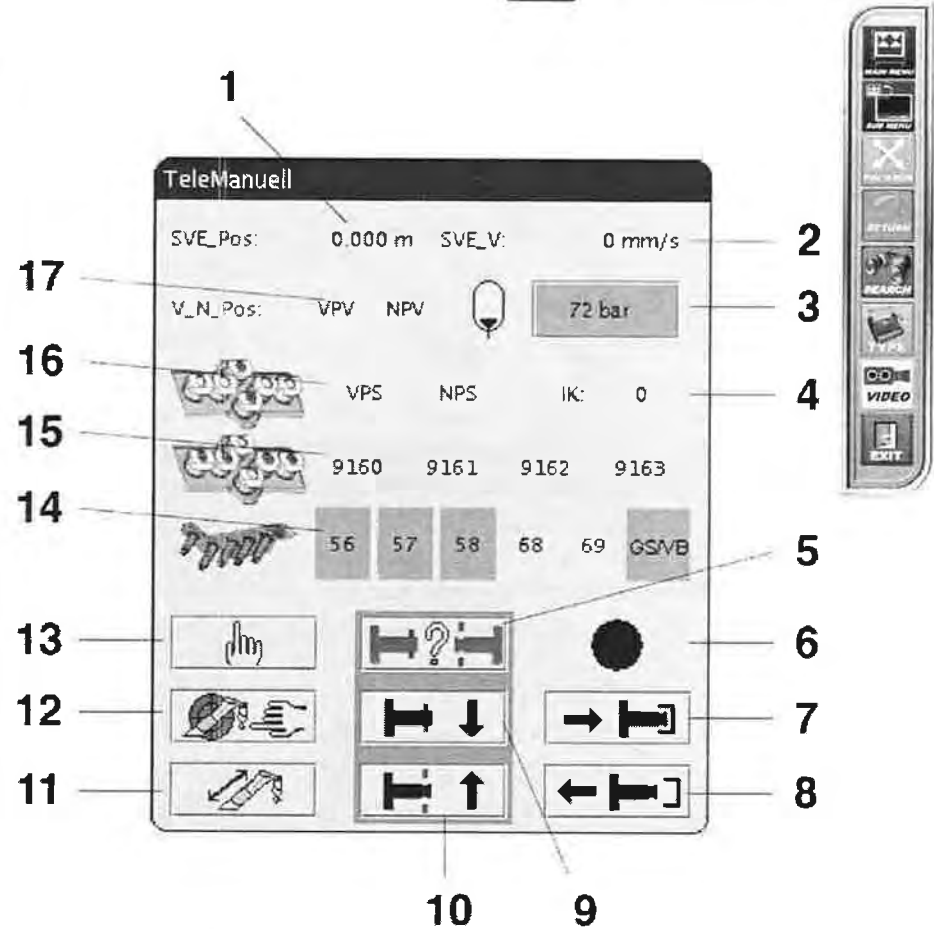
7. Retract the first telescopic section from the 100% locking hole to the 0% locking hole locked to the LPU by steering the control lever accordingly.


*The 90% and 45% pinning hole positions are crossed during the retraction process. The initiators for pinning then indicate whether any potential pinning positions have been crossed. In this case the two initiators “VPV” and “NPV” (17) are on a green background.*

*The unpinning procedure may only be actuated once the two initiators “VPV” and “NPV” (17) are on a green background after reaching the 0% pinning position.*



*Then the telescopic drive is telescoped out approx. 0,035 m (0.115 ft) (1st boom section, 0% pinning hole: for further extension lengths of the telescopic drive, see table in section “Locking and pinning positions of the telescopic drive”).*

8. As soon as the two initiators “VPV” and “NPV” (17) for the 0% pinning hole of telescopic section 1 are on a green background, actuate key (7, ). It is displayed on a red background. The pinning procedure is accomplished as soon as the locked and pinned state is indicated for the LPU by the symbol or digit '2' at (14, at the end of the line). 






9. In this state, actuate the key (7, ) again in order to complete the pinning procedure. It turns grey again.

*The respective valve remains in a switched position and the key remains on a red background if the key (7) is not actuated again.*

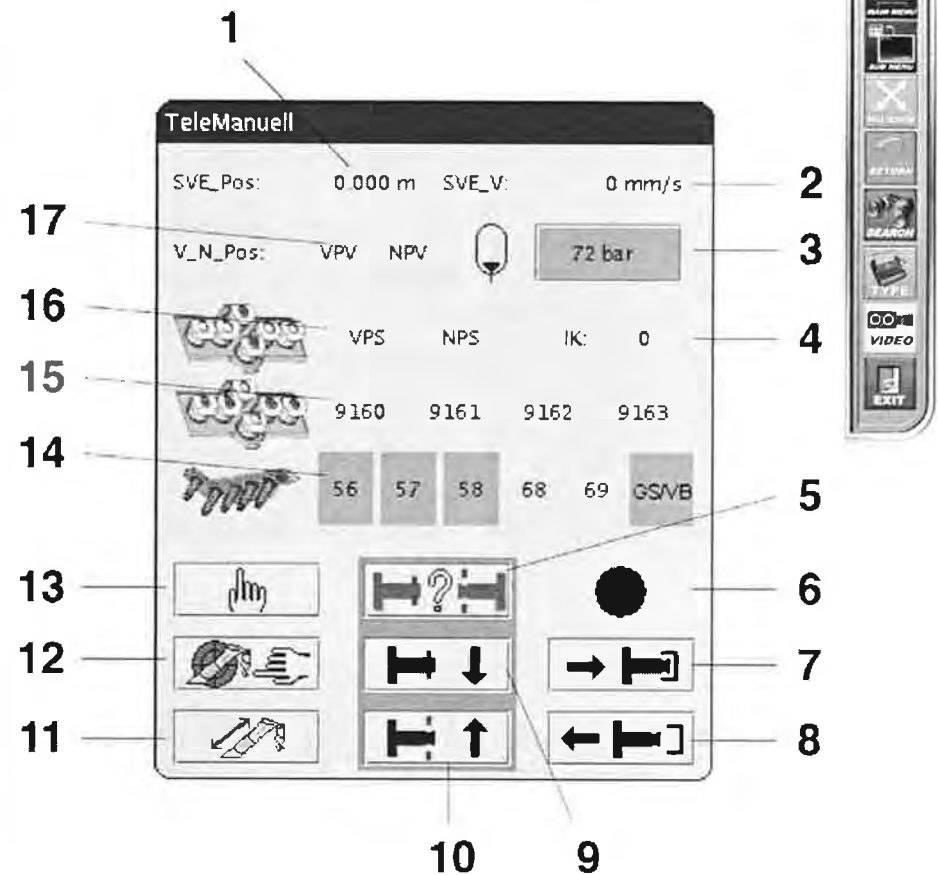
10. To unlock the LPU, press first the Preselect key, (5, ) then the Unlock key (10, ) and slowly continue telescoping. The unlocking procedure is then actuated automatically when the fine position (VPS and NPS "16" initiators active, i. e. on green background) is approached.

*The keys are displayed on a red background after actuation. They automatically turn grey again as soon as the selected procedure is over.*

If the unlocking procedure can not be started automatically, it can be started manually by pressing the unlock button.  (10). In this case the Preselection key (5, ) may not be actuated. The unlocking procedure is over as soon as the locked and pinned state is indicated for the LPU by the symbol  or digit '1' at (14, at the end of the line).

As a result, the sample manual telescoping procedure is in effect over.


In order to now switch to the **automatic telescoping**, the positions of all individual telescopic sections "must be taught" (defined and saved).



### Teaching the extension status of the telescopes

The telescoping system must be informed about the extension status of each telescope after manually telescoping the main boom. This procedure is referred to as "teaching".

Proceed as follows:

1. Push button  on the "TeleManual" screen, left side. The "TeleTeach" screen, right side) appears.

*All of the keys assigned to individual telescopes T1 – T5 are at first only filled in with a star. Subsequently, the current extension statuses for all telescopes must be selected manually. There are the following possibilities for selection:*

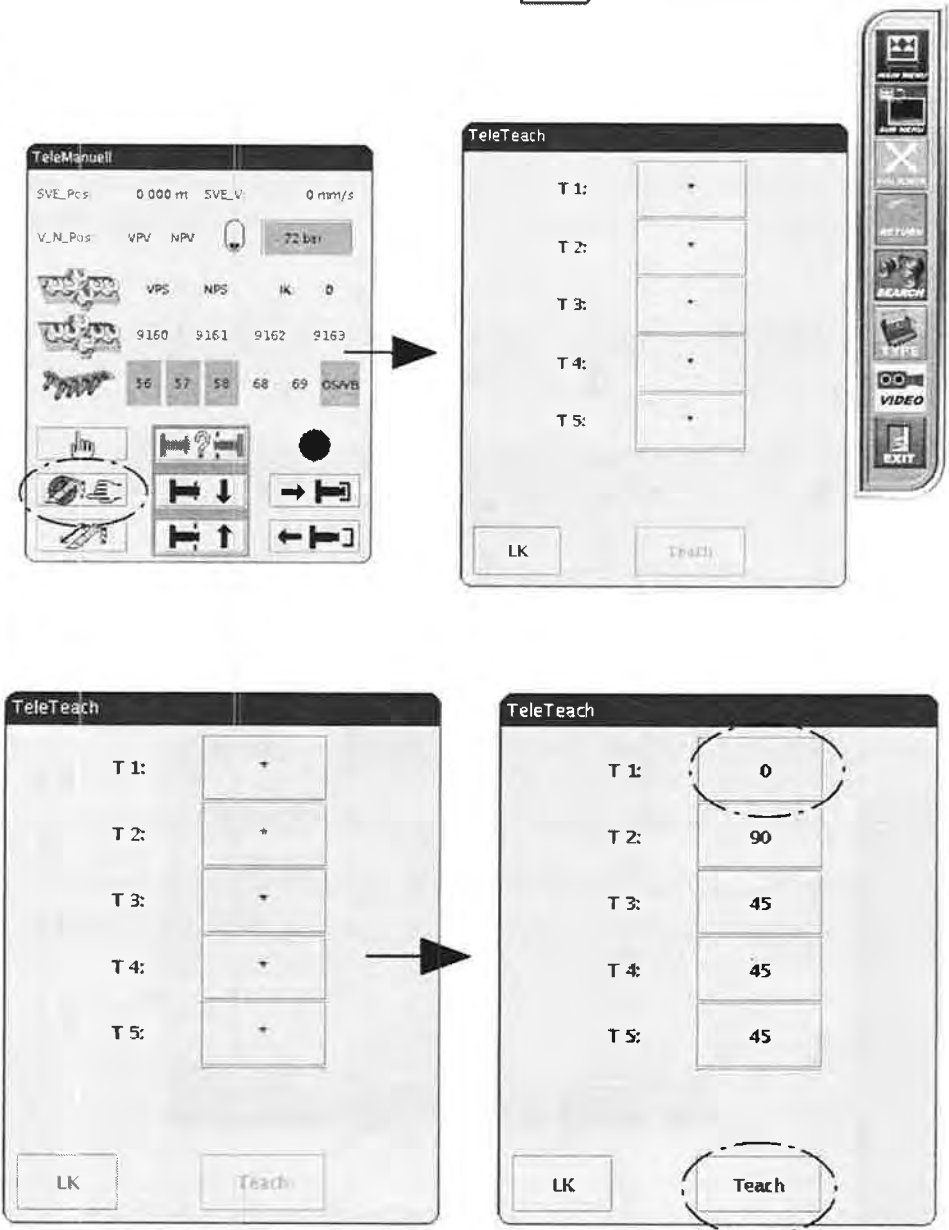
*"0", "45", "90" and "100" for the pinned state and "LPU" when the telescopic section is unpinned and locked to the LPU.*

2. Press key next to T1 until the value appears which corresponds to the actual extension state of T1 (here: 0, i.e. telescopic section 1 is 0% extended).
3. Repeat the procedure specified for telescope 1 accordingly for the remaining telescopes T2 – T5.
4. Make sure the defined status corresponds to the actual extension status for all telescopes. If so, actuate the "Teach" key. The initial screen "TeleManual" appears.

The saved values are adopted by the control system in precisely the same way. Incorrect values are unable to be identified as such.

### RISK OF ACCIDENTS

**During the "teaching" process only those values may be transferred to the control system which correspond to the actual state. The crane operator is solely responsible for this!**

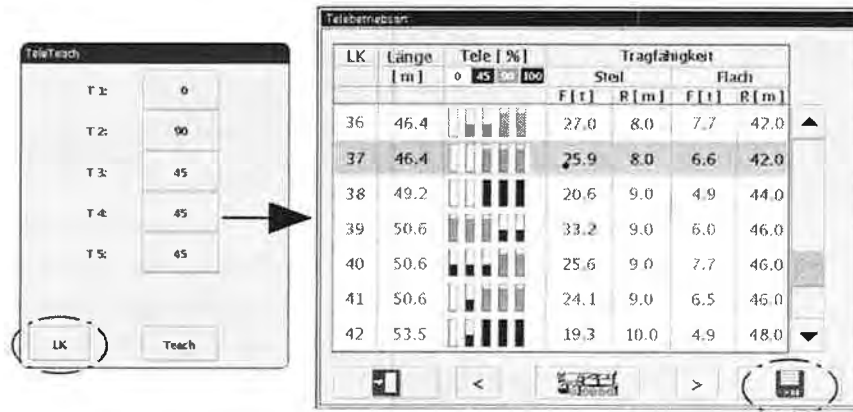


If the extension state of the telescopic sections correspond with a length code, the selection can be made faster than described:

press key "LK" and select the line of the length code which corresponds to the actual extension state of the telescopic sections.

Use button to exit the screen.

The screen "TeleManual" appears again and all field concerning the individual telescopes are then filled out together.



### AC200-1

LK	L(m)	1. IK	2. IK	3. IK	4. IK	5. IK	6. IK
1	12,4	0	0	0	0	0	0
2	16,6	0	0	45	0	0	0
3	16,6	0	0	0	45	0	0
4	16,6	0	0	0	0	45	0
5	16,6	0	0	0	0	0	45
6	20,9	0	45	45	0	0	0
7	20,9	0	0	45	45	0	0
8	20,9	0	0	0	45	45	0
9	20,9	0	0	0	0	45	45
10	20,9	0	0	0	0	0	90
11	25,1	0	45	45	45	0	0
12	25,1	0	0	45	45	45	0
13	25,1	0	0	0	45	45	45
14	25,1	0	0	0	0	45	90
15	29,4	45	45	45	45	0	0
16	29,4	0	45	45	45	45	0
17	29,4	0	0	45	45	45	45
18	29,4	0	0	0	45	45	90
19	29,4	0	0	0	0	90	90
20	33,6	45	45	45	45	45	0
21	33,6	0	45	45	45	45	45
22	33,6	0	0	45	45	45	90
23	33,6	0	0	0	45	90	90
24	37,9	45	45	45	45	45	45
25	37,9	0	45	45	45	45	90
26	37,9	0	0	45	45	90	90
27	37,9	0	0	0	90	90	90
28	40,0	0	0	0	100	100	100
29	42,1	90	45	45	45	45	45
30	42,1	45	45	45	45	45	90
31	42,1	0	45	45	45	90	90
32	42,1	0	0	45	90	90	90
33	44,2	0	0	45	100	100	100
34	46,4	90	90	45	45	45	45
35	46,4	45	45	45	45	90	90
36	46,4	0	45	45	90	90	90
37	46,4	0	0	90	90	90	90
38	49,2	0	0	100	100	100	100
39	50,6	90	90	90	45	45	45
40	50,6	45	45	45	90	90	90
41	50,6	0	45	90	90	90	90
42	53,5	0	45	100	100	100	100
43	54,9	90	90	90	90	45	45
44	54,9	45	45	90	90	90	90
45	54,9	0	90	90	90	90	90
46	58,5	0	100	100	100	100	100
47	59,1	90	90	90	90	90	45
48	59,1	45	90	90	90	90	90
49	62,8	45	100	100	100	100	100
50	63,4	90	90	90	90	90	90
51	67,8	100	100	100	100	100	100
52	67,0	90	100	100	100	100	100



### Locking and Pinning Positions of the Telescopic Drive

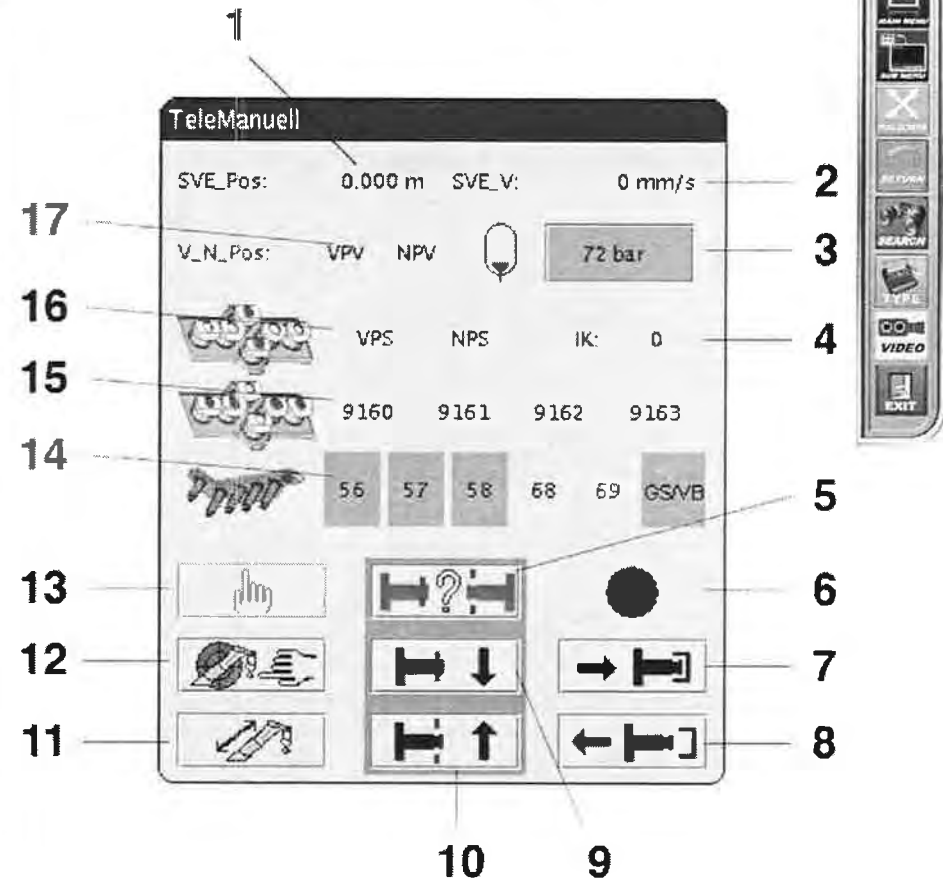
The locking and pinning positions are required during manual telescoping.

**The indicated extension lengths may be exceeded by approx. 0.05 m (approx. 2 in) at the most during manual telescoping so that the telescopic drive does not come off the inner guide rails.**

The table values correspond to the 'SVE\_Pos' (1) in the TeleManuell display.

#### AC200-1

Locking and pinning position			
Boom section	Pinning hole (%)	LPU position (m)	LPU position (ft)
1	0	0.06	0.197
	45	4.284	14.055
	90	8.531	27.989
	100	9.342	30.65
2	0	0.262	0.86
	45	4.487	14.721
	90	8.737	28.665
	100	9.506	31.188
3	0	0.461	1.512
	45	4.69	15.387
	90	8.938	29.324
	100	9.728	31.916
4	0	0.664	2.178
	45	7.889	16.04
	90	9.139	29.984
	100	9.93	32.579
5	0	0.851	2.792
	45	5.091	16.703
	90	9.344	30.656
	100	10.093	33.113
6	0	1.041	3.415
	45	5.281	17.326
	90	9.532	31.273
	100	10.093	33.113



## Monitoring the Extension Lengths During the Telescoping Procedure

During the telescoping procedure the current length of the boom as well as additional geometric data are displayed in field "D" on a crane symbol.

The current extension condition of the individual telescopic sections can be read off the telescoping information system (E51).

In addition, using switch (E51.4) the condition of the sensors and pins of the LPU can be followed during the telescoping procedure.

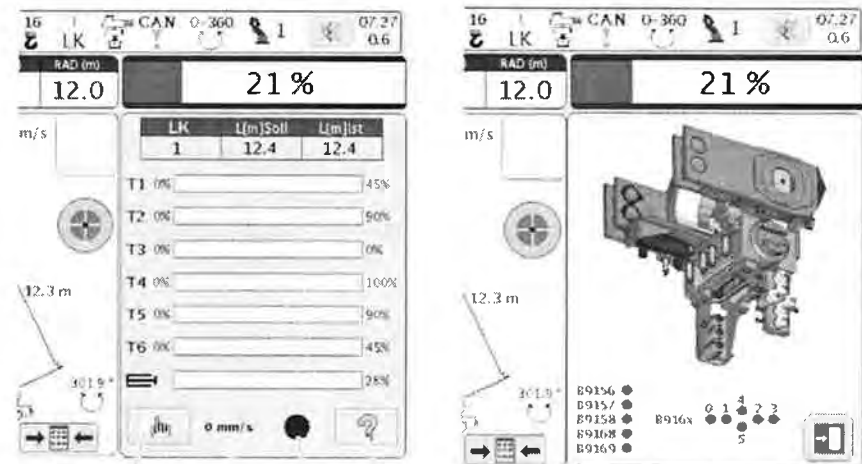
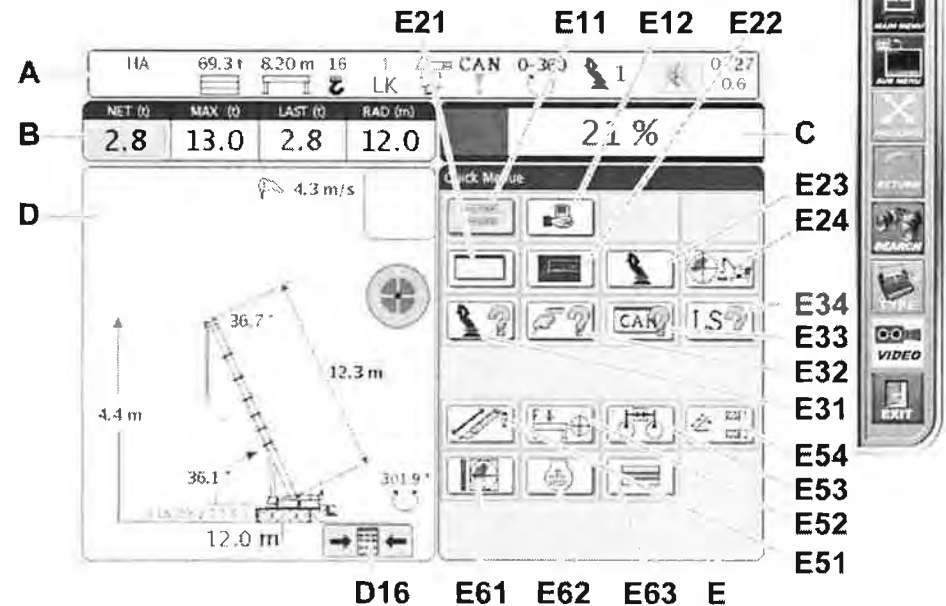
## Extension Sequence of the Telescopic Sections

The extension sequence of the telescopic sections is the sequence in which the individual telescopic stages are brought to their final lengths.

When the main boom is fully extended, the extension sequence is (6-5-4-3-2-1), i.e. first telescopic section 6, then telescopic section 5, etc. and finally telescopic section 1 is fully extended and pinned.

If all the telescopic stages are not required for the extension length selected, the extension sequence for the telescopic stages required is analogous.

When the telescopic sections are retracted the sequence is followed in reverse.



E51.7 E51.6 E51.5 E51.4

### Load capacities in the pinned condition

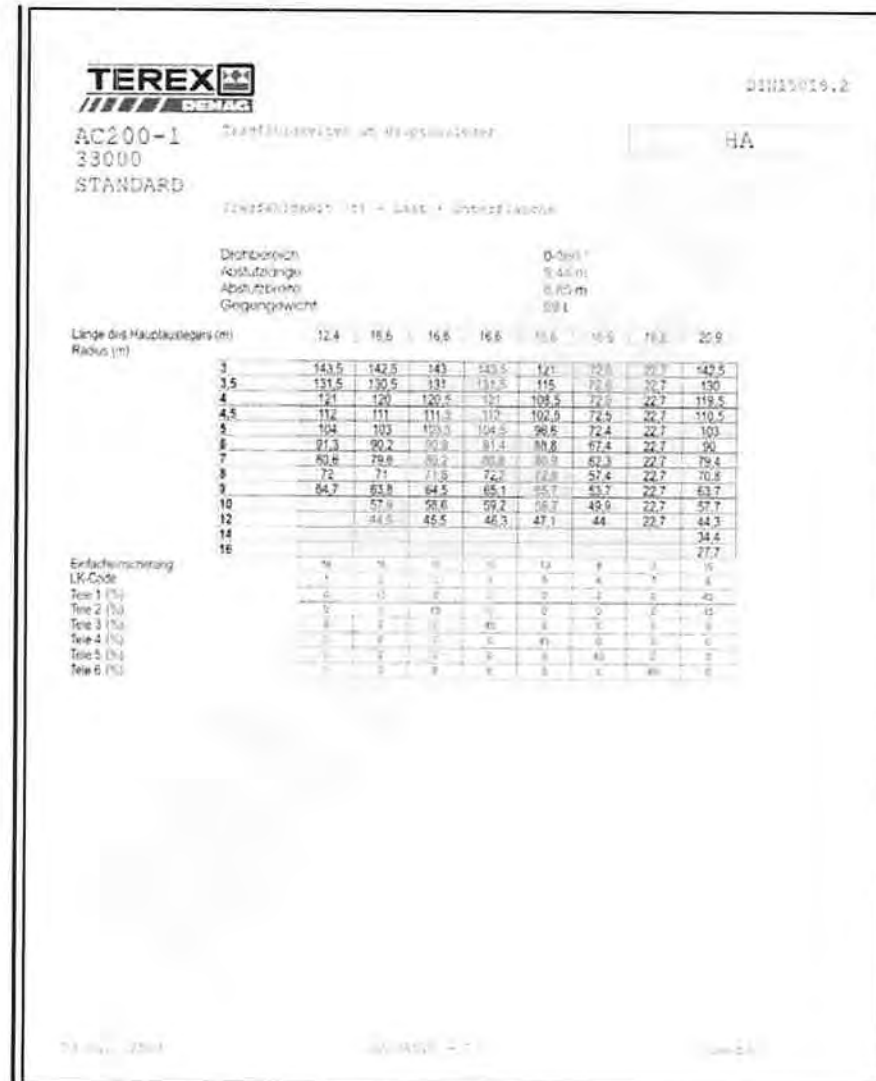
The lifting capacities that are specified in the load capacity tables in relation to the radius (see marked area in the display) only apply when all telescopic sections are pinned.

**The following load table is only a specimen. Only the load tables supplied with the crane may be used for operating the crane.**

### Lifting Capacities in the Unpinned Condition

In addition to the load capacities in the pinned condition of the main boom there are also load capacities for the case in which the largest extended boom section is unpinned:

- Unpinned lifting capacities for which the main boom length remain unchanged, so-called **“lifting capacities in intermediate positions”**.
- Unpinned load capacities, for which the main boom length is changed under load, so-called **“telescoping load capacities”**.



TEREX DEMAG  
AC200-1  
33000  
STANDARD

01111010.2  
HA

TELESCOPIERUNG: 101 - LAST: - Unterlasten

Drehbereich: 0-360°  
Ausladung: 9,45 m  
Abstützbreite: 6,00 m  
Gegenengewicht: 59 t

Länge des Hauptauslegers (m)	12,4	15,5	16,8	16,8	15,6	10,9	7,3	20,9
Radius (m)								
3	143,5	142,5	143	143,5	121	10,8	20,7	142,5
3,5	131,5	130,5	131	131,5	115	10,6	20,7	130,5
4	121	120	120,5	121	108,5	10,5	22,7	119,5
4,5	112	111	111,5	112	102,5	10,5	22,7	110,5
5	104	103	103,5	104	96,5	10,5	22,7	103
6	91,3	90,2	90,8	91,4	80,8	10,8	22,7	90
7	80,8	79,8	80,2	80,8	69,8	10,9	22,7	79,4
8	72	71	71,5	72	62,8	10,9	22,7	70,8
9	64,7	63,8	64,5	65,1	55,7	10,7	22,7	63,7
10		57,9	58,6	59,2	48,7	10,9	22,7	57,7
12		44,5	45,5	46,3	47,1	11,4	22,7	44,3
14								34,4
16								27,7

Erleuchtungsrichtung  
LK-Code  
Seil 1 (No)  
Seil 2 (No)  
Seil 3 (No)  
Seil 4 (No)  
Seil 5 (No)  
Seil 6 (No)



### Lifting Capacities in Intermediate Positions

The lifting capacities that are specified in the load capacity tables in relation to the radius only apply when all telescopic sections are pinned.

Example:

In straight main boom operation (operating mode HA), with a main boom length (A) of 20.9 m (68.6 ft), an extension state (E) of the individual telescopic sections of (0/45/45/0/0/0) (LK9) and a radius (B1) of 5 m (16.4 ft), the corresponding pinned lifting capacity (C1) would be 104 t (229 kip).

There are however also lifting capacities for the unpinned condition of the main boom. These enable load cases for the case that the crane cannot be operated with pinned lengths due to particular restricted space conditions. The bottom extended boom section is then connected to the telescoping cylinder via the LPU.

When attaching loads in the unpinned intermediate positions the attachable loads are limited additionally by the load capacity of the telescoping cylinder and the bend of the main boom.

These influences are contained in an additional table.

With the above example:

With a main boom length (A) of 20.9 m (68.6 ft), an extension state (E) of the individual telescopic sections of (0/45/45/0/0/0) (LK9) and a radius (B1) of 5 m (16.4 ft), the corresponding unpinned lifting capacity (D1) would be 30.7 t (67.7 kip).

The specification in this additional table is a maximum value, which is not absolutely applicable. This maximum value “unpinned” is – related to the resulting radius – balanced against the value “pinned” of the load limit device.

If – as in this case – the value “pinned” of 104 t (229 kip) (C1) is larger than the value “unpinned” of 30.7 t (67.7 kip) (D1), the permitted load is reduced to 30.7 t (67.7 kip).

If the radius were 16 m (52.5 ft) (B2), the value “pinned” 29 t (63.9 kip) (C2) would be smaller than the value “unpinned”, in this case also 30.7 t (67.7 kip) (D2). The permitted load is reduced to the pinned value of 29 t (63.9 kip).



**AC200-1  
33000  
STANDARD**

Tragfähigkeiten am Hauptausleger

DIN15019.2

HA

Tragfähigkeit (t) Last - Unterflasche

Drehbereich 0-360°  
Abstützung 8.44 m  
Abstützweite 6.95 m  
Gegengewicht 69 t

Länge des Hauptauslegers (m) Radius (m)	A					
	20.9	20.9	20.9	20.9	20.9	20.9
3	142.5	118	72.8	63.2	22.7	11.1
3.5	131	110.5	72.5	60.9	22.7	11.1
4	120.8	101	72.5	57.4	22.7	11.1
4.5	111.2	92.5	71.2	55.3	22.7	11.1
5	104	83.7	69.5	53.2	22.7	11.1
6	91	65.9	48	49.1	22.7	11.1
7	80.4	75.4	62.5	45.3	22.7	11.1
8	71.8	30.2	58	42.7	22.7	11.1
9	64.7	64.9	53.7	40.2	22.7	11.1
10	58.7	59.6	49.4	37.7	22.7	11.1
12	45.7	46.9	43.5	33.1	22.7	11.1
14	36.7	36.9	38.1	28.6	22.7	11.1
16	29	30.1	31.1	25	22.7	11.1
18					22.7	11.1
20					22.7	11.1

23 Jul 2003

Deutsch

		A		B	
		20.9	20.9	20.9	20.9
B1	5.0	104	30.7	104	30.7
	16.0	104	30.7	29	30.7
B2	16.0	29	30.7	29	30.7
	20.0	29	30.7	29	30.7

This comparison of the pinned load with the table value is automatically carried out by the load limit device. The crane operating mask then always shows the actual attachable load at For (D20) the length code relevant to the load limit device and the resulting radius for this extension condition and luffing angle is displayed in "red". With the LLD-relevant LC and the radius, the additional table can be consulted to find the corresponding unpinned maximum value.

In the first case the red spec. would be (LC9/5) (= length code 9 / radius step 5 m / 16.4 ft).

In the second case the red spec. would be (LC9/16) (= length code 9 / radius step 16 m / 52.5 ft).

Intermediate values are interpolated.

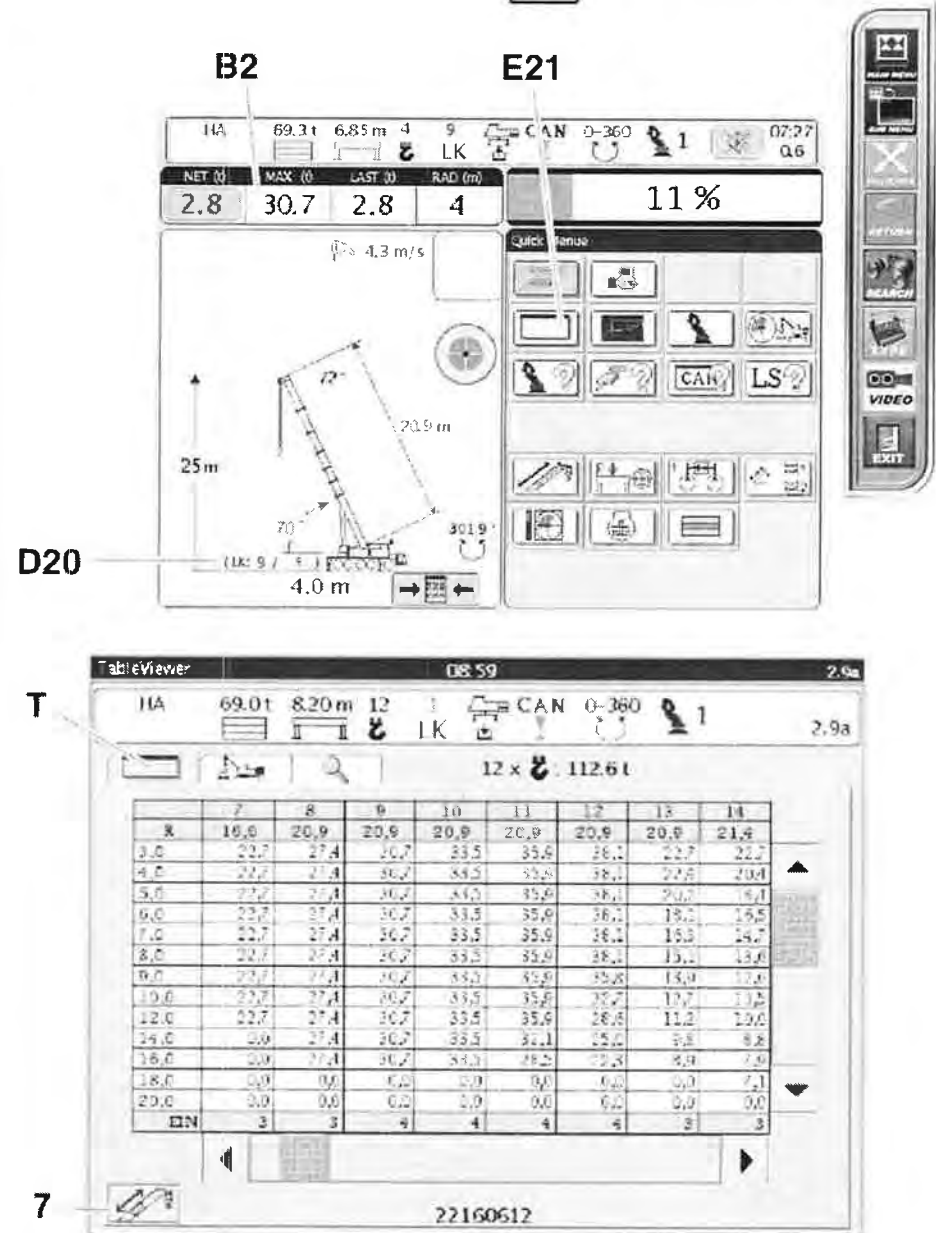
The additional table "unpinned loads" can be displayed on the screen.

Procedure:

- Select the button (E21) in the crane operating mask
- The operating mode selection mask appears
- Select the button (T, table symbol) in the operating mode selection mask:

The table "pinned load capacity" for the set operating mode appears. On the button (7) a symbol of a crane boom is displayed (without arrow).

- Select button (7): switch to additional table "unpinned load capacities". The table "unpinned load capacities" appears. On the button (7) a symbol of a crane boom is shown with a double arrow.



### Example

Operational planning has shown that due to lack of space, when there is a radius of 5 m (16.4 ft), a main boom length of approx. 18 m (59.1 ft) is needed. The mass of the load to be raised is 30 t (66.1 kip).

Proceed then as follows:

- Select the locked main boom length above the one actually required (here: 20.9 m / 68.6 ft).
  - Search for the length combination that offers the best values in the unpinned intermediate positions for the desired radius (here: LC 12, extension condition: 0/0/0/45/45).
- For 30 t (66.1 kip) of load to be raised LC 9/10/11 could also be relevant.
- Enter the corresponding length code (here: LC 12) and telescope out the main boom in accordance with the information in the tele control system without load until telescopic section 6 is pinned at 45% and telescopic section 5 is extended out in the locked and unpinned condition to the point where the required main boom total length of approx. 18 m (59.1 ft) has been reached.

At this point calculate the telescoping procedure using the information of the tele control system.

The permitted unpinned load capacity corresponds with the table value of the additional table "unpinned" (here: 38.1 t / 84 kip), as it is lower than the pinned value (here: 53.5 t / 118 kip). The load of 30 t (66.1 kip) can then be raised with the telescopic boom in the unpinned condition.

At the current point in time, the max. authorized load capacities in the intermediate position for operation with main boom extension are 2 t (4.4 kip).

**TEREX AC200-1 33000 STANDARD**

DIN15019.2

Tragfähigkeiten am Hauptausleger

HA

Telegänge (H) | Top | Unterfahrbühne

Einbaubereich: 0-360°  
 Abstützabstand: 6.44 m  
 Abstützbreite: 6.85 m  
 Gegengewicht: 69 t

Radius (m)	20.9	20.9	20.9	20.9	20.9	21.4	21.4	21.4	21.4
3	122.5	118	75.6	63.3	22.7	22.7	15	14	14
3.5	151	110.5	72.5	60.2	22.7	22.7	15	14	14
4	120.5	101	72.5	57.4	22.7	22.7	15	14	14
4.5	111.5	92.2	71.2	54.3	22.7	22.7	15	14	14
5	102	83.2	69.5	51.2	22.7	22.7	15	14	14
6	91	73.5	66	47.7	22.7	22.7	15	14	14
7	80.4	65.4	62.3	45.1	22.7	22.7	15	14	14
8	71.6	58.2	58	42.2	22.7	22.7	15	14	14
9	64.7	51.9	53.7	39.2	22.7	22.7	15	14	14
10	58.7	46.6	49.4	36.2	22.7	22.7	15	14	14
12	45.7	35.2	43.5	31.1	19.4	17	14.8	14.3	14.3
14	35.7	26.9	31.1	24.2	16.1	12	12.7	12.1	12.1
16	28	20.7	21.1	17	13.6	11.6	10	10.5	10.5
18						12.4	10.1	10.5	10.5
20							10.5	10.8	10.8

Einfacherschöpfung  
 LK Code: 12  
 Teil 1 (%): 0  
 Teil 2 (%): 0  
 Teil 3 (%): 0  
 Teil 4 (%): 45  
 Teil 5 (%): 45  
 Teil 6 (%): 0

28 Jul 2008 22104512-2 Detail

TableViewer 08:59

HA 69.0t R.20m 12 CAN 0-360 1

12 x 112.6t

R	7	8	9	10	11	12	13	14
3	16.8	20.5	20.5	20.5	20.9	20.9	20.9	21.4
3.5	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
4	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
4.5	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
5	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
6	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
7	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
8	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
9	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
10	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
12	22.2	27.6	30.2	33.5	33.5	33.5	33.5	33.5
14	0.0	27.6	30.2	33.5	33.5	33.5	33.5	33.5
16	0.0	27.6	30.2	33.5	33.5	33.5	33.5	33.5
18	0.0	27.6	30.2	33.5	33.5	33.5	33.5	33.5
20	0.0	27.6	30.2	33.5	33.5	33.5	33.5	33.5
EN	1	2	3	4	4	4	3	3

22160512



### Telescoping Lifting Capacities

The lifting capacities in intermediate positions are also authorized during a telescoping procedure.

However, the lifting capacities that are **actually achievable** during telescoping under load are only given as approximate values due to the large number of variable external influences.

The telescopic load capacities (on request) are achieved under the following conditions:

- Sliding surfaces well lubricated
- normal ambient temperature
- The systematic of the tele control system when carrying out the extension sequences are predetermined and do not need to be determined by the crane operator.
- The main boom angle may not be changed by the luffing gear during the telescoping procedure.

### Main boom state to move the crane in transport position

To move the crane in transport position, all telescopic sections have to be completely retracted and pinned and the LPU has to be secured for transport configuration in the prescribed position (6th telescopic section).

**Otherwise there is a risk of the locking and pinning unit moving/ sliding by itself in an uncontrolled manner. If the LPU is secured in the wrong place the indicated axle loads are incorrect.**

Starting situation:

main boom telescoped in and set down on the crane chassis in transport position; current LK = 1.

Proceed then as follows:

1. Switch on the ignition on the superstructure and start the engine.

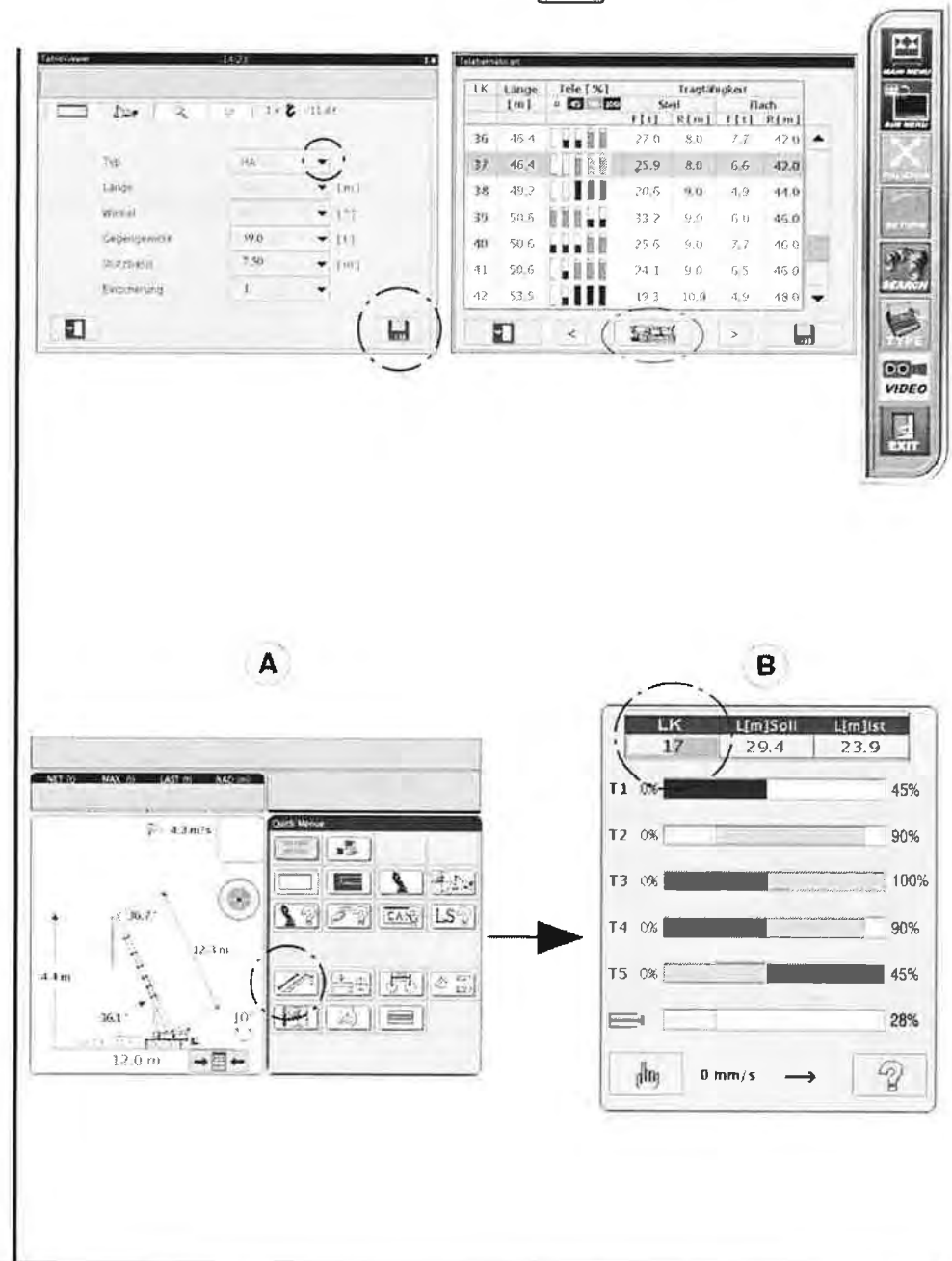
The IC-1 will start and the “Operation mode pre selection” (top left) will then appear.

2. Select “HA” operating mode and save by actuating the button.

The input screen “Quick Menu” appears on the right side of the IC-1 display (“A”).

3. Push button there. The mask “Telescoping display” (“B”) appears.

4. Push the “LK” button. The “Tele operating mode” screen appears (top right).

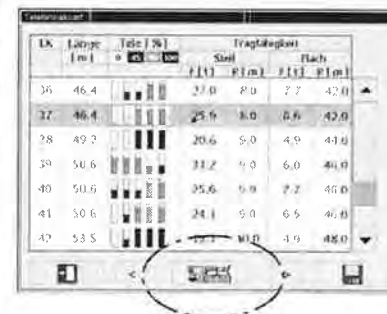


5. Press push button  and steer the corresponding control lever in the direction “Telescoping out” – the LPU is driven accordingly and locked onto the 5th boom section.

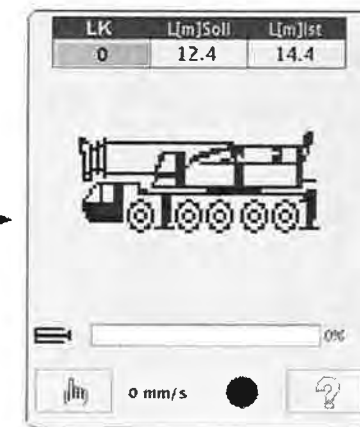
*The control lever has to be actuated long enough that crane represented on the screen appears (right side).*

*Only then is the main boom (including the LPU) in transport position for moving the crane.*

After moving, a length code can be selected again for the main boom working range using the “LK” button.



LK	Länge [m]	Tide [%]	Tragkapazität			
			Stiel	Flach	F11	F12
36	46.4		27.0	9.0	7.7	42.0
37	46.4		25.9	8.0	6.6	42.0
38	49.2		20.6	5.0	4.9	44.0
39	50.6		31.2	9.0	6.0	46.0
40	50.6		35.6	9.8	7.2	46.0
41	50.6		24.1	9.0	6.5	46.0
42	53.5		33.7	10.0	7.9	48.0

LK    L[m]Soll    L[m]Ist  
 0    12.4    14.4

0 mm/s

