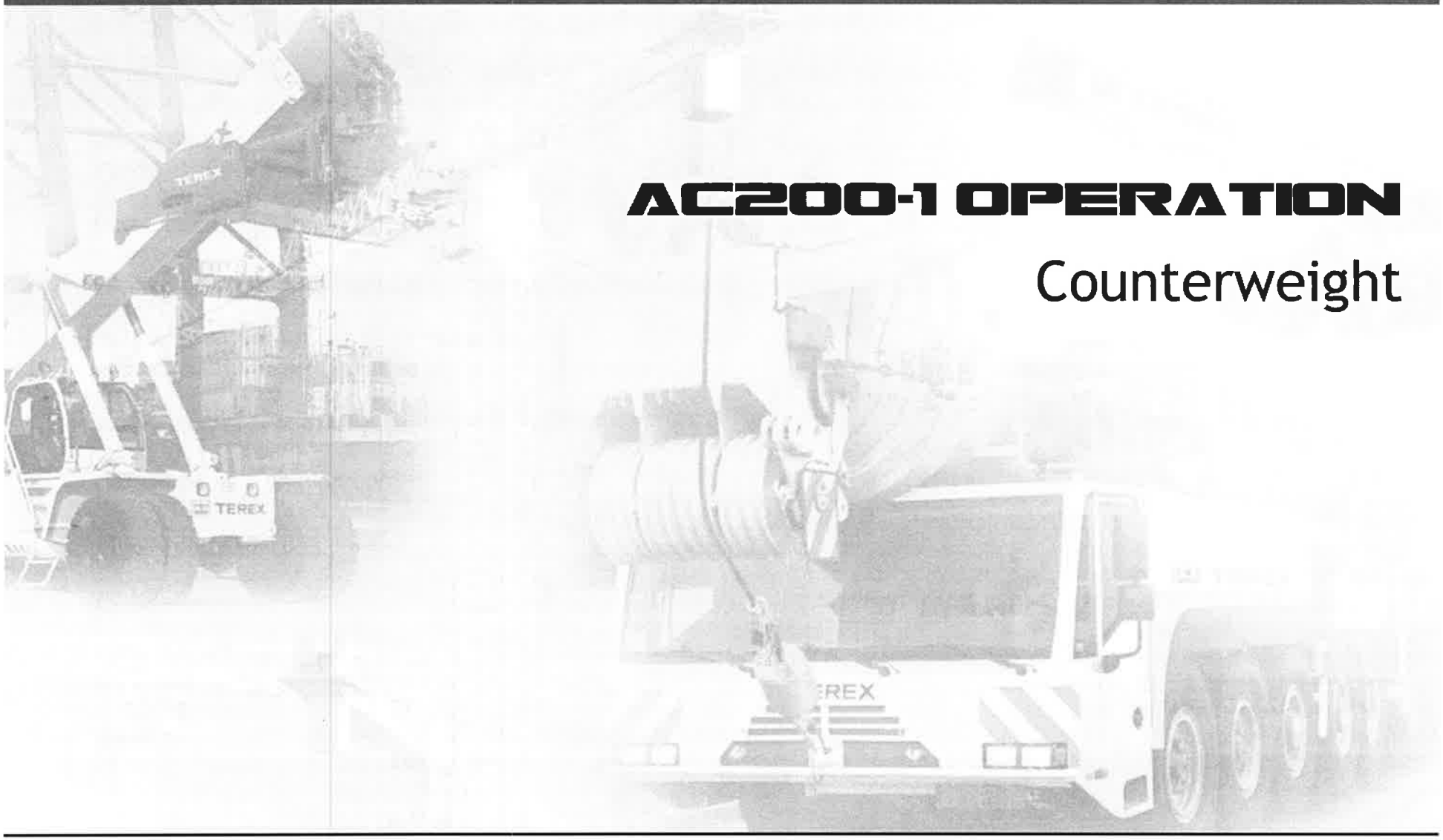
TEREX®

GLOBAL CRANE TRAINING




# AC200-1 OPERATION

## Counterweight

# Counterweight Content

## Counterweight

### Important fitting instructions

When fitting and removing individual counterweight elements there is a risk of crushing between the individual counterweight elements, between the counterweight and superstructure frame, between the counterweight and undercarriage (counterweight support) and between the counterweight base frame and the individual counterweight elements!

To avoid these hazards, the safety instructions in section 1, sub-point "When assembling and dismantling crane components" must be observed.

Especially make sure you keep a sufficient safety distance.

Individual counterweights are stacked with the help of an additionally trained person who is, as an exception, on the crane with the crane operator during fitting and removal of the counterweight. This person must leave the crane or the endangered area immediately after completing the actual configuration procedure.

The crane operator must be in continual visual contact with this person and ensure that there is no-one else in the hazardous areas. Before the superstructure is slewed, the crane operator must make sure that this person has left the crane and/or hazardous areas.

When rotating the superstructure, there is risk of crushing between the counterweight and any obstacles which are nearby.

It is forbidden to remain under hanging loads or in areas where there is risk of loads falling.

All counterweight elements must be attached at the attachment points provided.

Make sure that the attached element is not at an angle or swinging when it is raised! The counterweight is attached in the desired configuration from the crane operator's cab.

The crane operator operates the erection and pin locking cylinders using buttons.

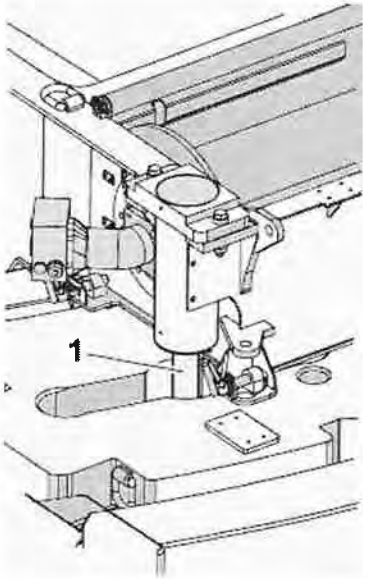
The execution of the relevant movements are displayed to the crane operator on the display of the IC-1. In order to see the relevant display in field "**E", you select the „Quick** menu E57".

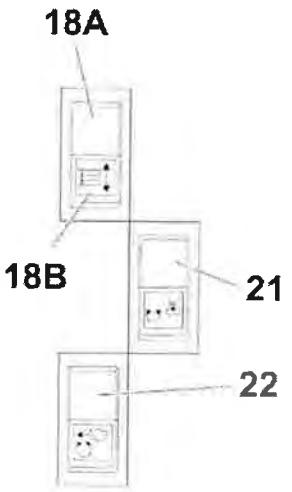
**If the support bases are reduced, the largest counterweight assigned to the loading status specified in the table may be assembled as a maximum. If a larger counterweight is used, there is a danger of tipping over to the rear during slewing**

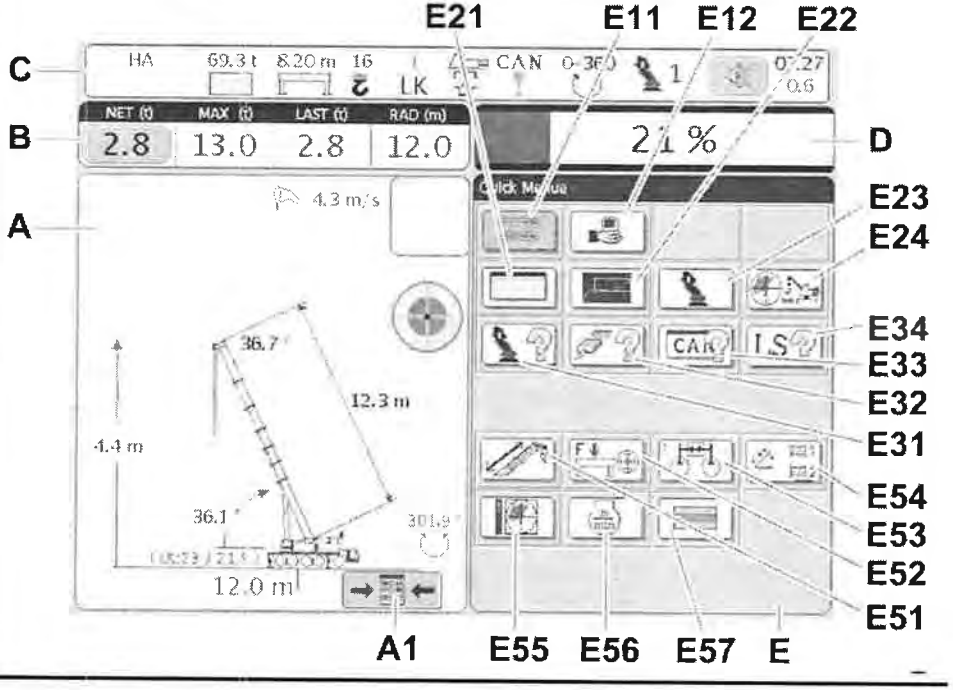
**Operating elements / auxiliary equipment**

**1.Counterweight cylinder**

When the button (**18, S9380) is activated, the piston rods of** the counterweight cylinder (**1) on the left and right side of the** superstructure are driven down (**18B) or up (18A) together.**



## 2. Control display on IC-1

After button (**E57) has been selected, the** counterweight configuration view appears at (**E). This displays** the current status information for the state of the counterweight fitting. **E57.1: Bridging switch in case of malfunctions**

**By selecting this switch the locking functions for fitting the counterweight are switched off.**

**Before bridging the counterweight, a warning sign will ensue. This must be acknowledged.**

**The crane operator should know the instructions on configuring the counterweight from the manual. He must be aware of the endangered area, especially of the risk of people being crushed.**

**Danger of crushing and damage!**

**If the counterweight has been bridged, there is no monitoring by the SPS.**

By pressing the switching surface 1, this mask can be exited with bridging.

By pressing the switching surface 2, the bridging will be active:

In the top picture, the symbol for bridging is displayed. The symbol (**25)then appears in the crane operating mask.**

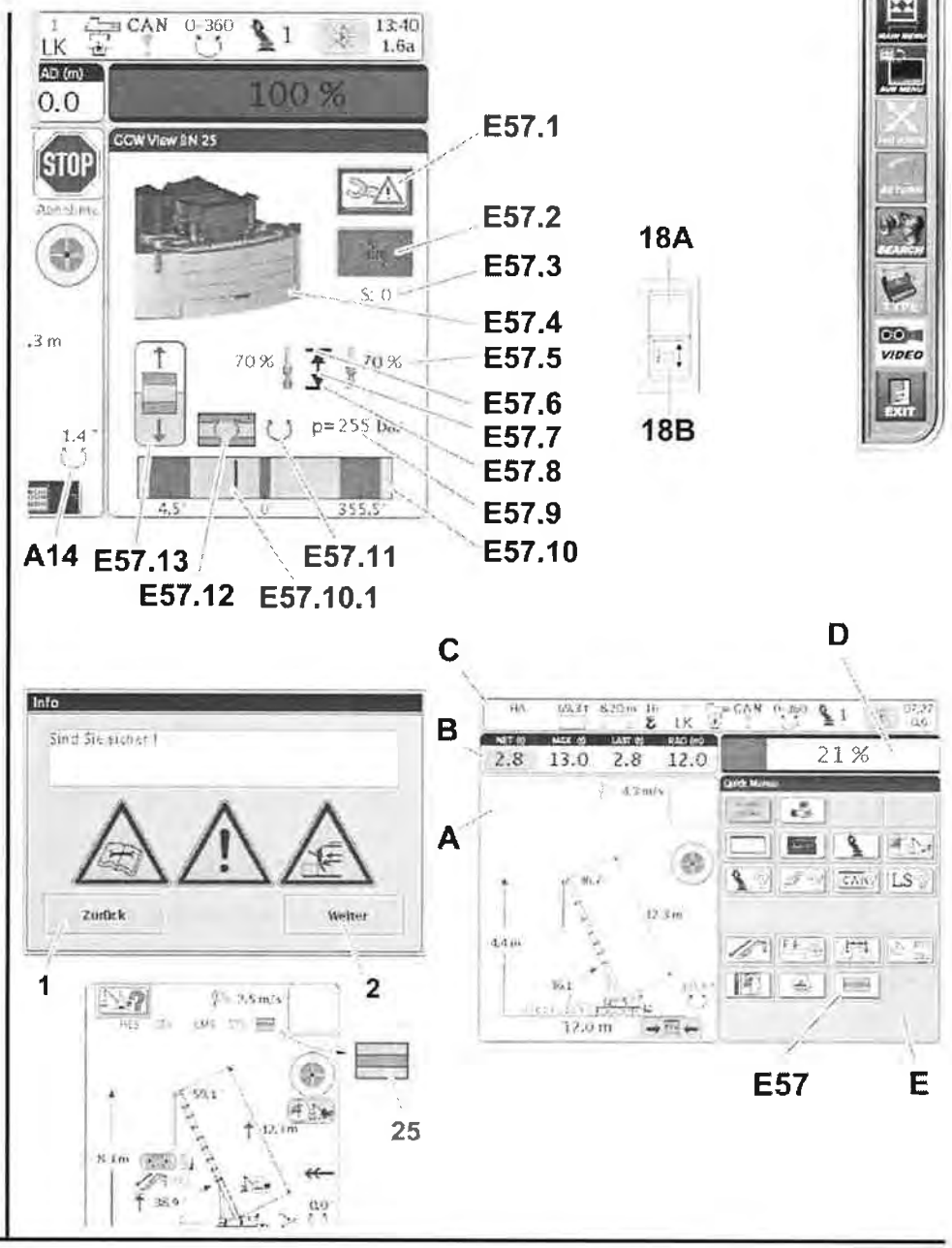
**E57.2: Switching "Manual Fitting – Automatic Fitting";**

**Automatic counterweight: Green/Grey = On/Off**

**E57.3: Status of the current condition of the removal procedure**

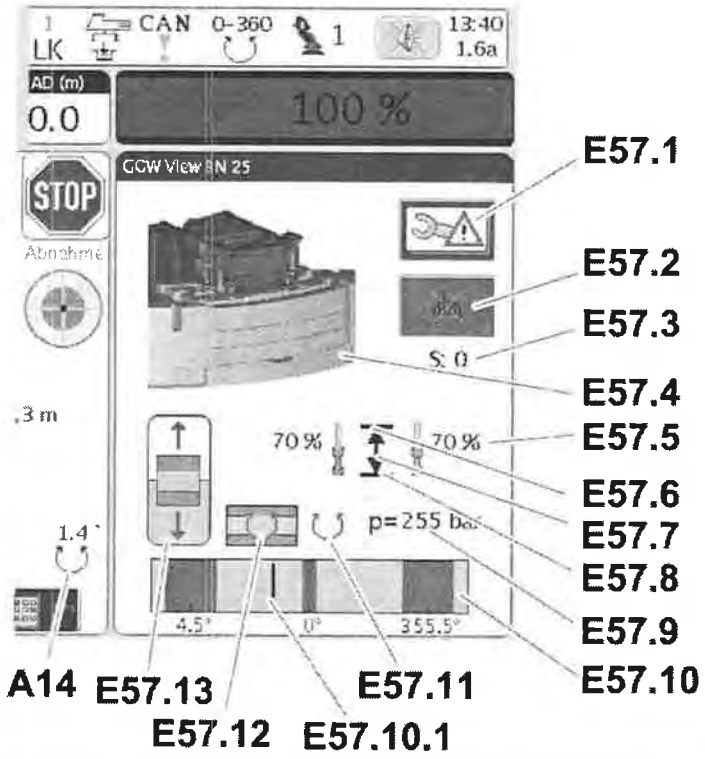
**E57.4: visual display of the current condition of the fitting procedure and/or when the counterweight is fitted the selected counterweight combination in the operating mode selection mask**

**E57.5: Extension status of the counterweight lift cylinder in %**



**E57.6: Upper cross bar:**
**Counterweight lift cylinder in upper end position**
**E57.7: Arrow symbols for the movements Raise and Lower.**
**E57.8: Lower cross bar:**
**Counterweight lift cylinder in the lower end position**
**E57.9: current hydraulic pressure in the counterweight hoist cylinders**
**E57.10: Angular indicator**
**Mask showing the important angle settings for the fitting procedure are displayed here**
**E57.10.1: Line display showing the position of the superstructure**
**E57.11: Display showing whether the superstructure can be slewed in its current counterweight condition:**
red arrow: slewing not permitted
green arrow: slewing permitted
**E57.12: Display to show whether the superstructure can be slewed with the counterweight lift cylinder retracted in the counterweight:**
red arrow: slewing not permitted
green arrow: slewing permitted

**E57.13: Symbolic display of switch 18 on the instrument panel**
Green/Red = release/no release for raising or lowering
When the switch is activated, the relevant page is depicted in grey.
**A14: shows the current superstructure angle**

**Assembling the counterweight**

**Preassembly of the counterweight on superstructure frame**

- The appropriate counterweight combination is preassembled on the superstructure frame on the counterweight support.

*For this purpose, guide lines are welded onto the chassis frame as a visual centering aid. There are suitable indentations on the lower part of the counterweight for this reason.*

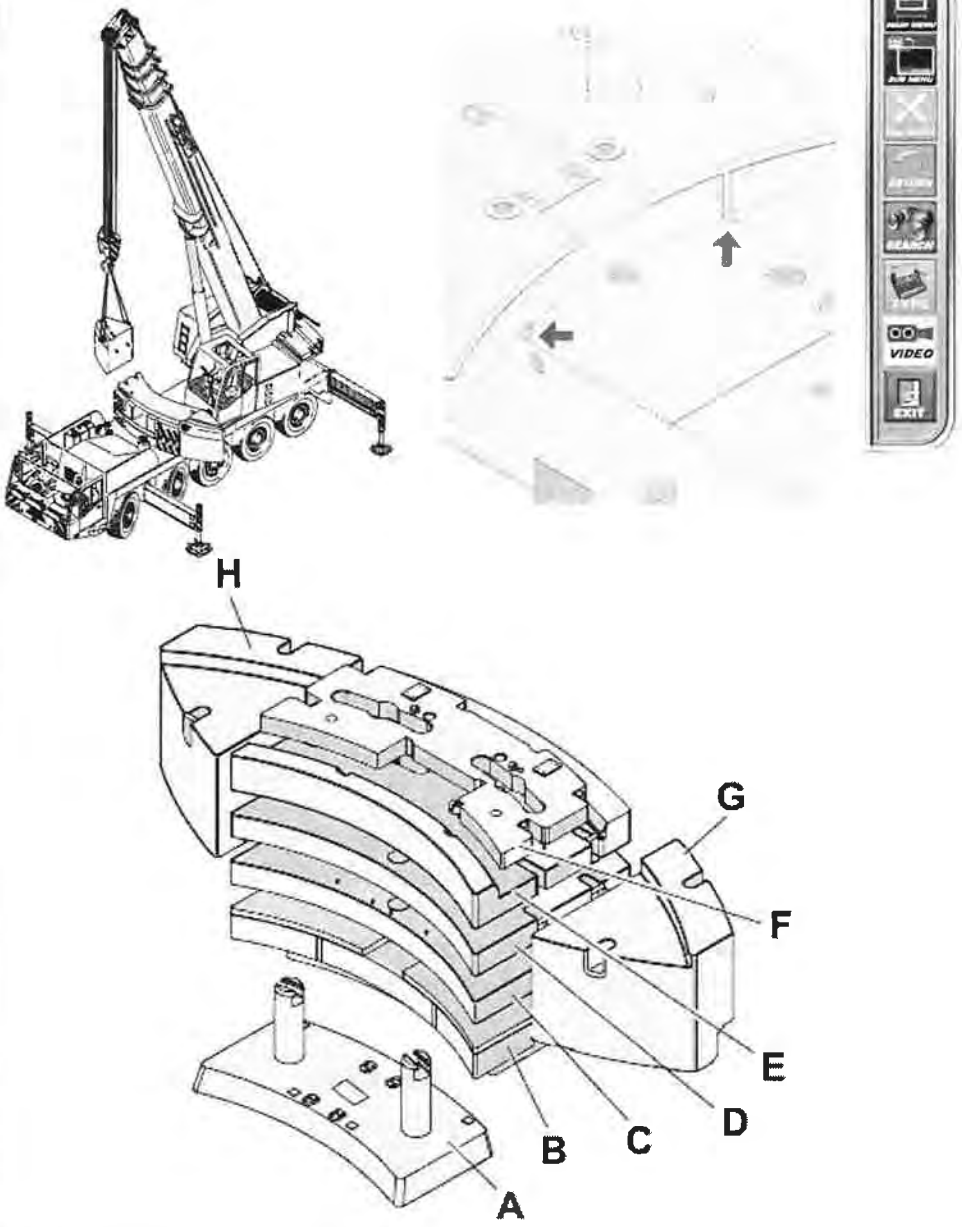
*The counterweight support is between the chassis-cab and the superstructure frame mounting (slew ring).*

**If the support bases are reduced, the largest counterweight assigned to the loading status specified in the table may be assembled as a maximum. If a larger counterweight is used, there is a danger of tipping over to the rear during slewing.**

**An overview of the counterweight:**

**A - 5.7 t**
**B - 7.3 t**
**C - 9.0 t**
**D - 9.0 t**
**E - 9.1 t**
**F - 3.2 t**
**G - 12.77 t**
**H - 12.77 t**

All counterweights are equipped with grooves and cams. Generally, any configuration may only be continued when the grooves of all components lying on top are exactly flush with and lying on top of the corresponding cams.



**Load capacities for fitting and removing the counterweight elements.**

All counterweight combinations can, as a rule, be fitted and removed using your own crane. The **load capacity tables 0 t** are valid for the resulting load types.

**Only lifting tackle with sufficient dimensions may be deployed.**

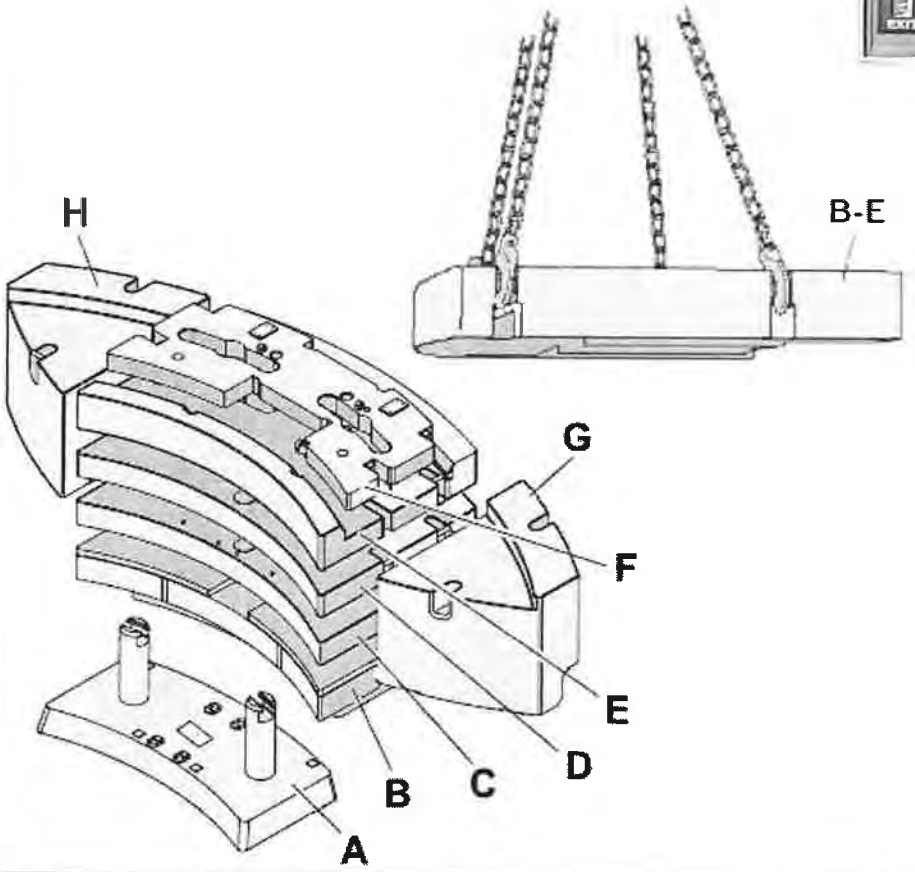
Special suspension gear is available as an option for attaching single counterweight elements or several elements together in accordance with the specifications of the corresponding load capacity tables. This special suspension gear can be ordered at the crane manufacturer.

- the load blocks on section (**A) may be loaded with 5 t, the load** blocks on section (**B) may be loaded with 8 t, the cast bolts of** the sections (**C, D, E, G and H) may be loaded with max. 6.5 t.**
- with the sections „**A - F" the centre of gravity is exactly** between the load blocks and bolts.

*The sections "**B - E" may only be attached with 4 chains***

- when fitting the section (**F) on the superstructure frame using** the auxiliary crane, this must be attached diagonally with 2 chains to avoid damaging the superstructure hydraulic tank.
- the saddle weights (**G) and (H) must be attached with 2** chains.
- It is possible to raise the entire counterweight package using the jack; however, it is only permitted when suitable shackle pins are attached to the jack eyelets (shackle pins through the eyelet!).

- the sections (**A) and (B) form one unit. They are always** marked with a serial number (xxx xxx 12-**A and xxx xxx 12-B) and must not be replaced or** mixed with sections with other serial numbers.
- to attach the saddle weights (**G and H) the sections (C and D)** must be seated (identically). The saddle weights must be attached to the upper of the two sections (**D)** - the sections (**E and F) can be fitted either before or after** attaching the saddle weights.



**Suspending and bolting the counterweight**

Starting status for assembling the counterweight is:

- The counterweight configuration to be fit is set down on the chassis.
- The counterweight cylinder is retracted.
- Rotate the superstructure back so that it is approx. +/- 10° to the longitudinal axle.

The counterweight can be fitted in **automatic mode or manually:**

**Basic procedure:**

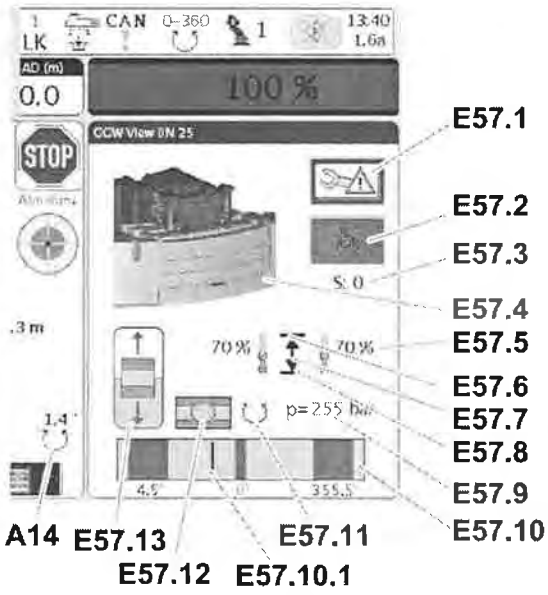
- Turn the superstructure to the rear: main boom angle 4.5° or 355.5°
- Telescope counterweight lift cylinder into the kidney-shaped grooves of the counterweight sections.
- Rotate superstructure to position "0° back".
- Retract the counterweight lift cylinder: The draw bar of the counterweight and the rod end of the hydraulic cylinder are made so that the counterweight on the superstructure frame is raised

After selecting the button (**E57) a display of the** current condition appears at point "**E" of the counterweight** (top graphic).

When switching on the counterweight configuration view you are in manual mode. The symbol (**E57.2) is shown "grey".** The hand symbol is **not crossed out.**

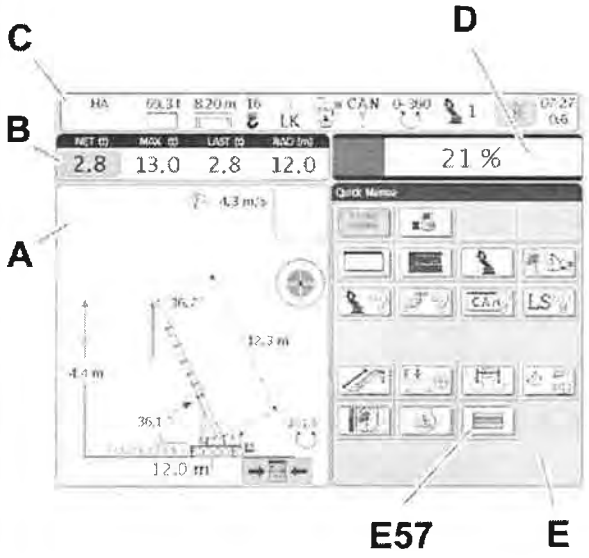
When the counterweight is ready fitted after the fitting procedure, and the selection mask is set in the operating mode, the current counterweight is shown at point (**E57.4).**

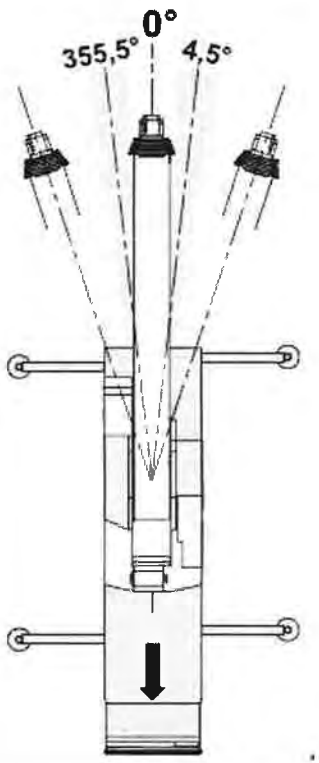
The status display (**E57.3) then is "S: 0".**







**Automatic Fitting of the Counterweight**

- Activate button (**E57.2**):

In automatic operation, the "hand symbol" is then crossed through and the symbol shown "green".

- Depending on the assignment of the pilot control sensors, the lever used for slewing the superstructure must be actuated: The slewing direction must be selected so that the angle range of 4.5° to 355.5° is approached. (Example: the superstructure is at 10°: The lever must be actuated so that the superstructure turns anticlockwise as seen from above.)

Throughout the entire fitting procedure, the pilot sensor must now be held in this direction. After fitting has been completed, the superstructure remains in the "0° back position", even though the pilot sensor is still held to the side. The pilot sensor must then be released temporarily.

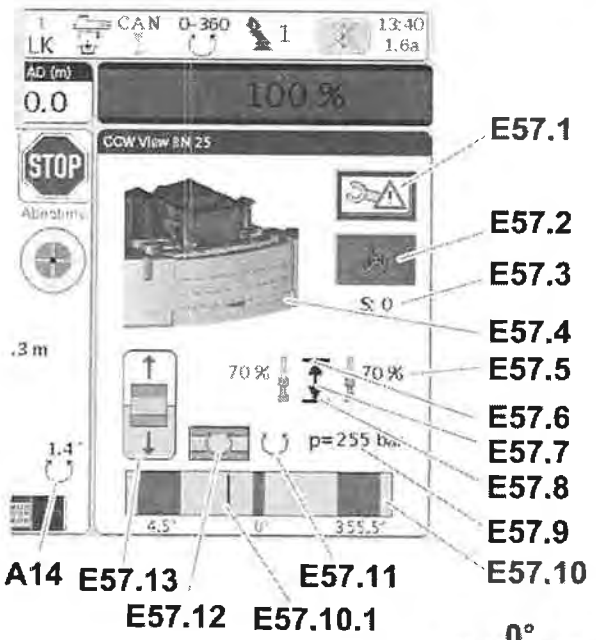
When the lever is actuated again the crane is once again in the crane operating condition. During the fitting procedure the individual operating steps are worked through as described in the "basic procedure" at the beginning of this point.

On the display the individual steps can be followed.

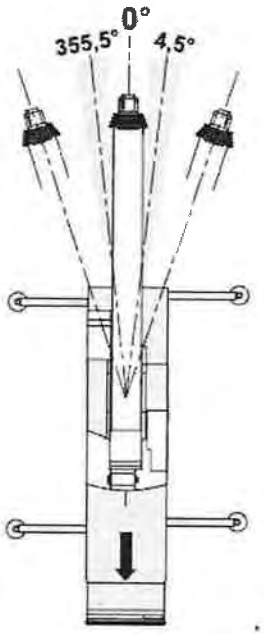
If, at the beginning of the fitting procedure, the slewing angle was between 355.5° and 4.°, the fitting procedure is interrupted depending on the slewing direction when the counterweight lift cylinder is lowered.

*The automatic fitting procedure is continued when the pilot sensor is steered out of the opposite direction.*

The slew gear is in the closed circuit during the fitting procedure. This setting cannot be modified. The control system also assumes control of the engine speed, in order to achieve a sufficient sensibility.



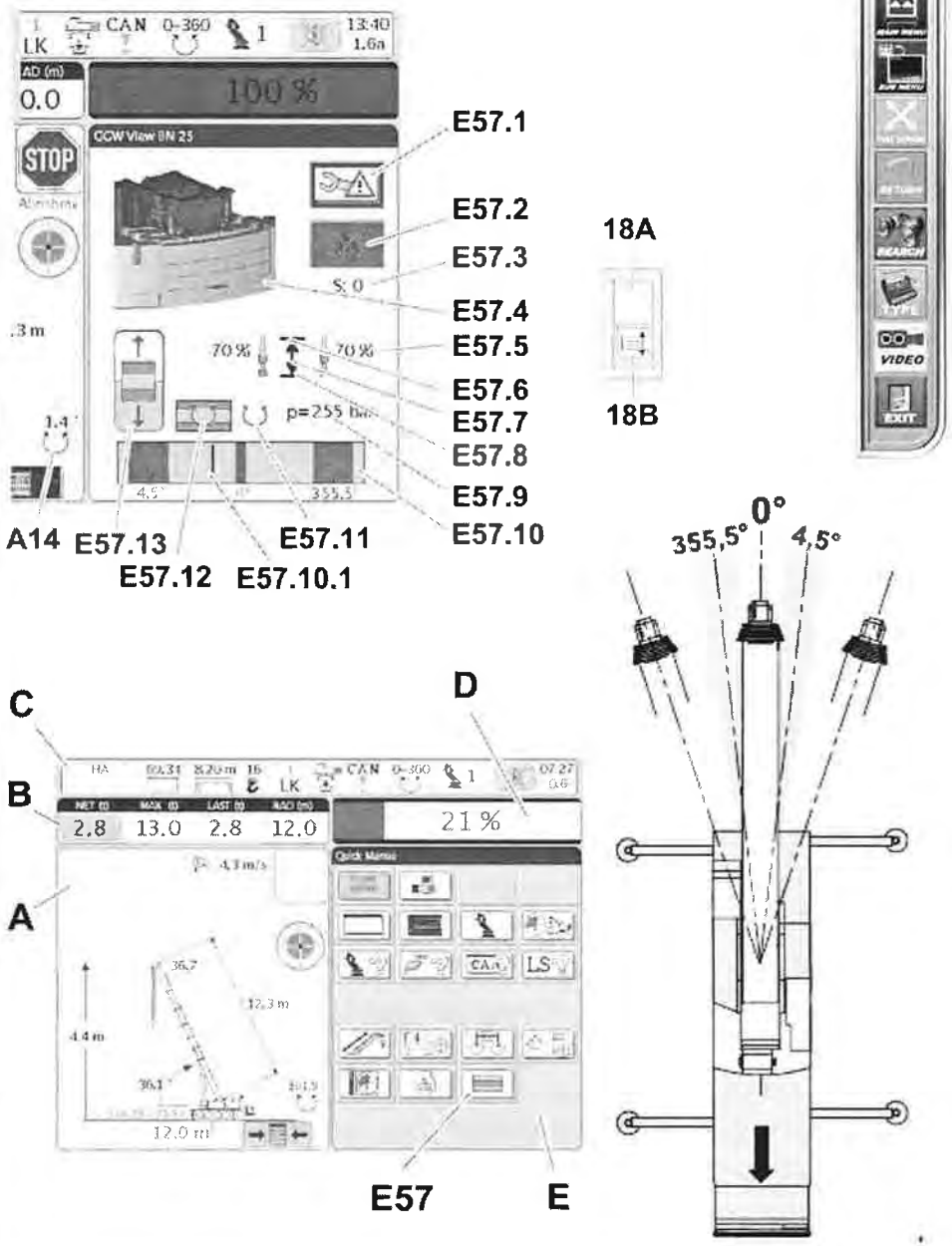


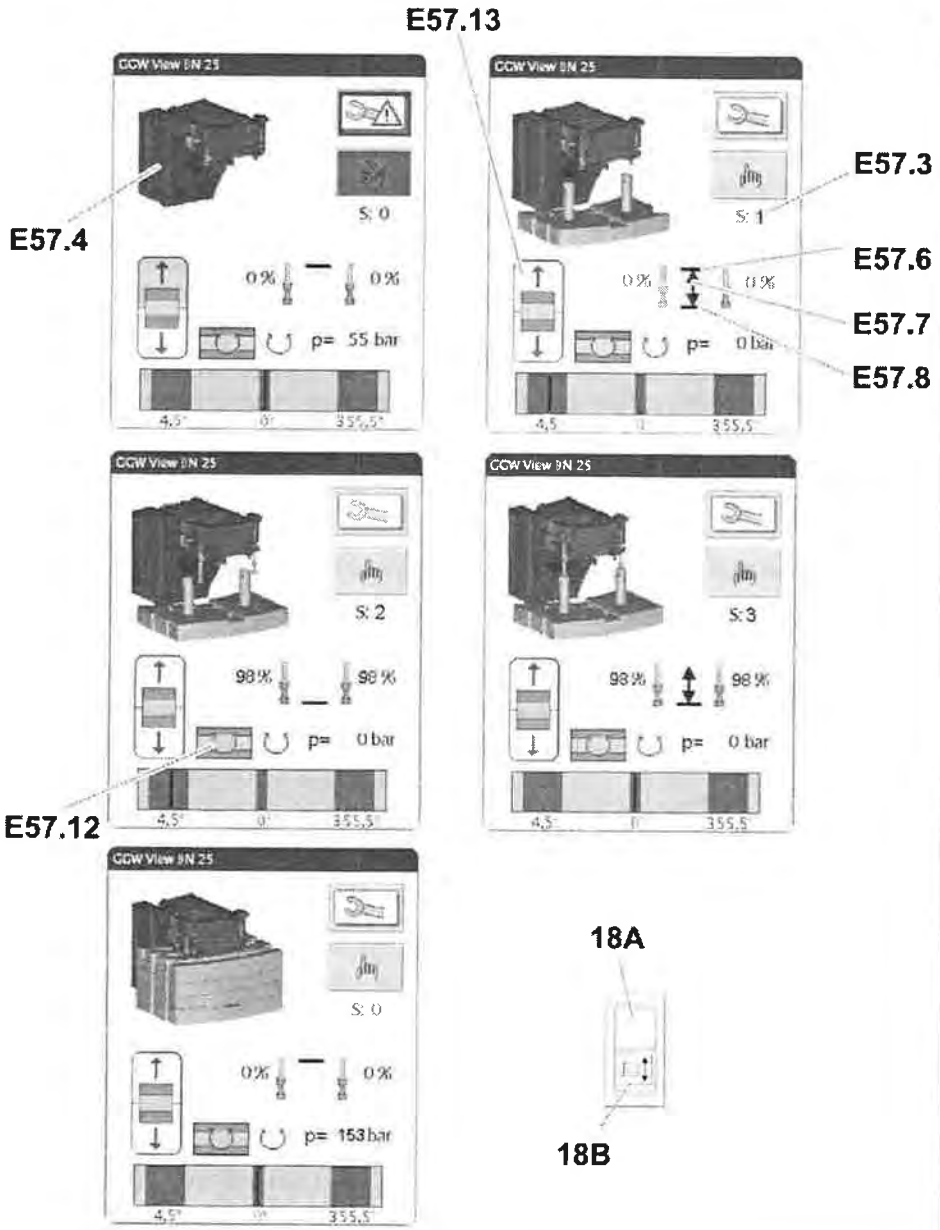



**Example Fitting the Counterweight with Automatic Operation:**
Automatic operation can only be selected when the top cylinders or the counterweight are fitted.
Activate automatic operation and steer out the pilot sensor for the slew gear. The configuration procedure is now carried out by the program.
The configuration procedure is completed when status **S:3 has** been achieved. Then the pilot sensor must return to 0° position once, so that the slew gear is released again. The color of the automatic display changes from "green" to "grey".
*Special case: If the automatic device begins at 0° +/- 5.5° the* pilot control lever must be moved in the other direction, once status **S:2 has been reached.**

**Manual Fitting of the Counterweight**

- After the button (**E57) has been activated, the** crane is the mode for manual operation. The „automatic symbol" (**E57.2) is now NOT crossed through.**
- During the fitting procedure, the individual steps are carried out by alternate actuation of the pilot lever and the switch (**18) in the instrument panel.**
- Depending on the pilot control lever assignment, the lever must be actuated which starts the superstructure slewing movement:
The slewing direction must be selected so that the angle range of 4.5° to 355.5° is approached from the outside. (Example: the superstructure is at 10°: the pilot control sensor must be actuated so that the superstructure turns anticlockwise as observed from above).
- **"S: 0" (E57.3) indicates the start and end state. The** CWT is displayed that has been selected in the operating mode selection mask.
- When an angle range of approx. 5° or 355° "superstructure-to chassis-angle" is reached a line appears (**E57.10.1) on the** display (**E57.10), which marks the current angle.**



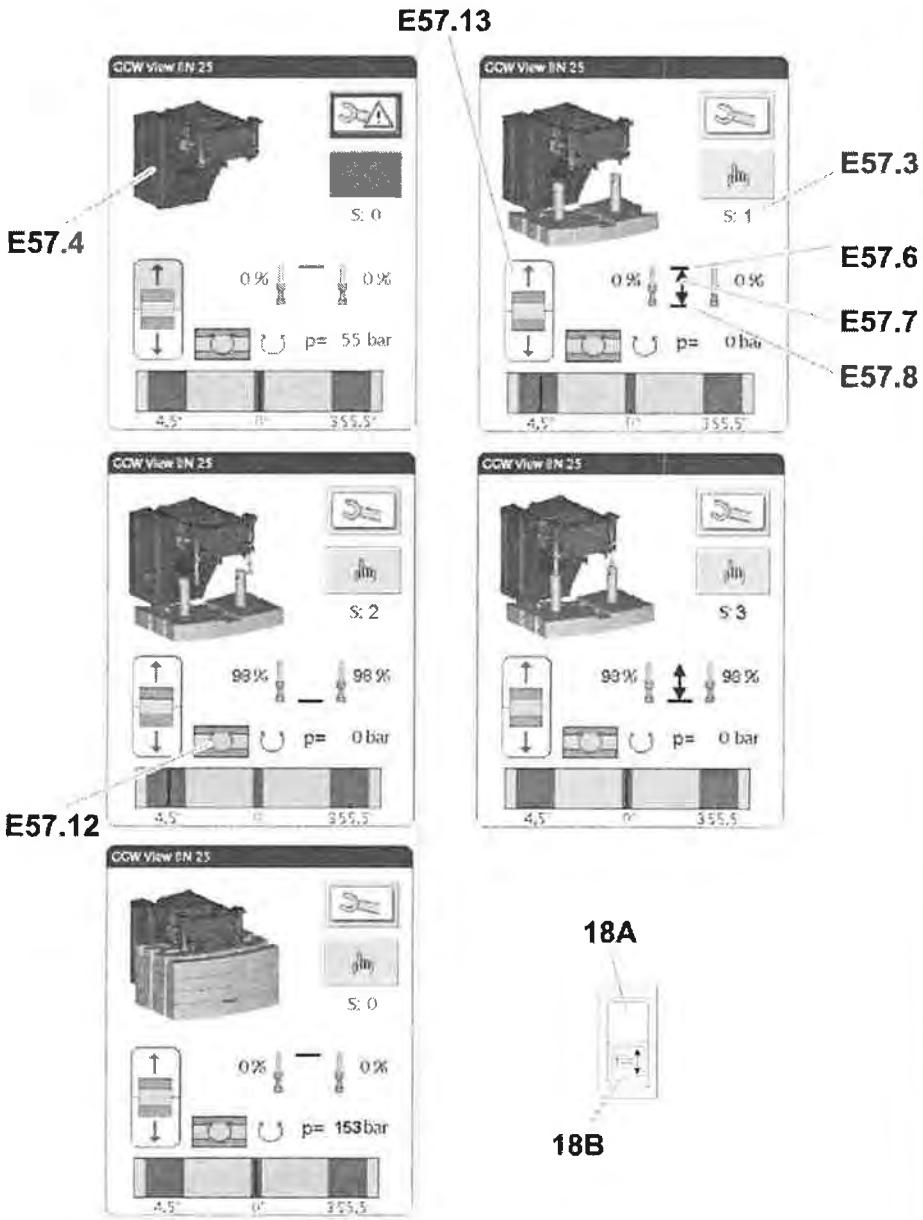



(Example: the superstructure stands at 10°: After starting the slewing movement in the direction "0°-to the rear position" when the 5° angle range is reached, the line (E57.10.1) appears at the left end of the display which indicates the current rotation angle.)

- The rotation movement must be continued until the line is in the colored area at 4.5° or 355.5°, depending on the fitting direction.
- Status (**E57.3**) **is then changed to "S:1".**

*If you leave the colored angle area (4.5° or. 355.5° +/- 1°), the status display (**E57.3) jumps back to „S:0".***

- Throughout the entire rotation movement, the rotation circuit (**E57.11) is displayed in "green". This means that rotation of** the superstructure is permitted.




- Extension of the counterweight lift cylinder by actuating switch (**18B) in the instrument panel (only possible in "S:1" status):**

For (**E57.7) the arrow symbol then appears. At (E57.6) the bar** then disappears.

- If the counterweight lift cylinder is completely extended, a bar appears at (**E57.8).**

After releasing the switch (**18B) at (E57.7) the arrow symbol** disappears. At (**E57.12) the permitted slewing direction is then** shown "green".

- Continued rotation of the superstructure in the "0° back position". Status (**E57.3) changes to "S:2".**

- **S:3: Position in which the cylinders in the CWT are located** and lifting is allowed. The arrow of display (**E57.13) which is** pointing upwards is shown in "green".

- Retraction of the counterweight lift cylinder by activating the switch (**18A). While switch (18) is activated, the arrow symbol** appears at (**E57.7). The cross bar disappears from (E57.8)** after you remove the counterweight lift cylinder from the bottom end position.

- When the counterweight lift cylinder has reached its top end position, the figure changes to a status "**S:0" display. Then the** figure of the counterweight set in the operating mode pre-selection mask is displayed.

**Example Fitting the Counterweight without Automatic Operation:**

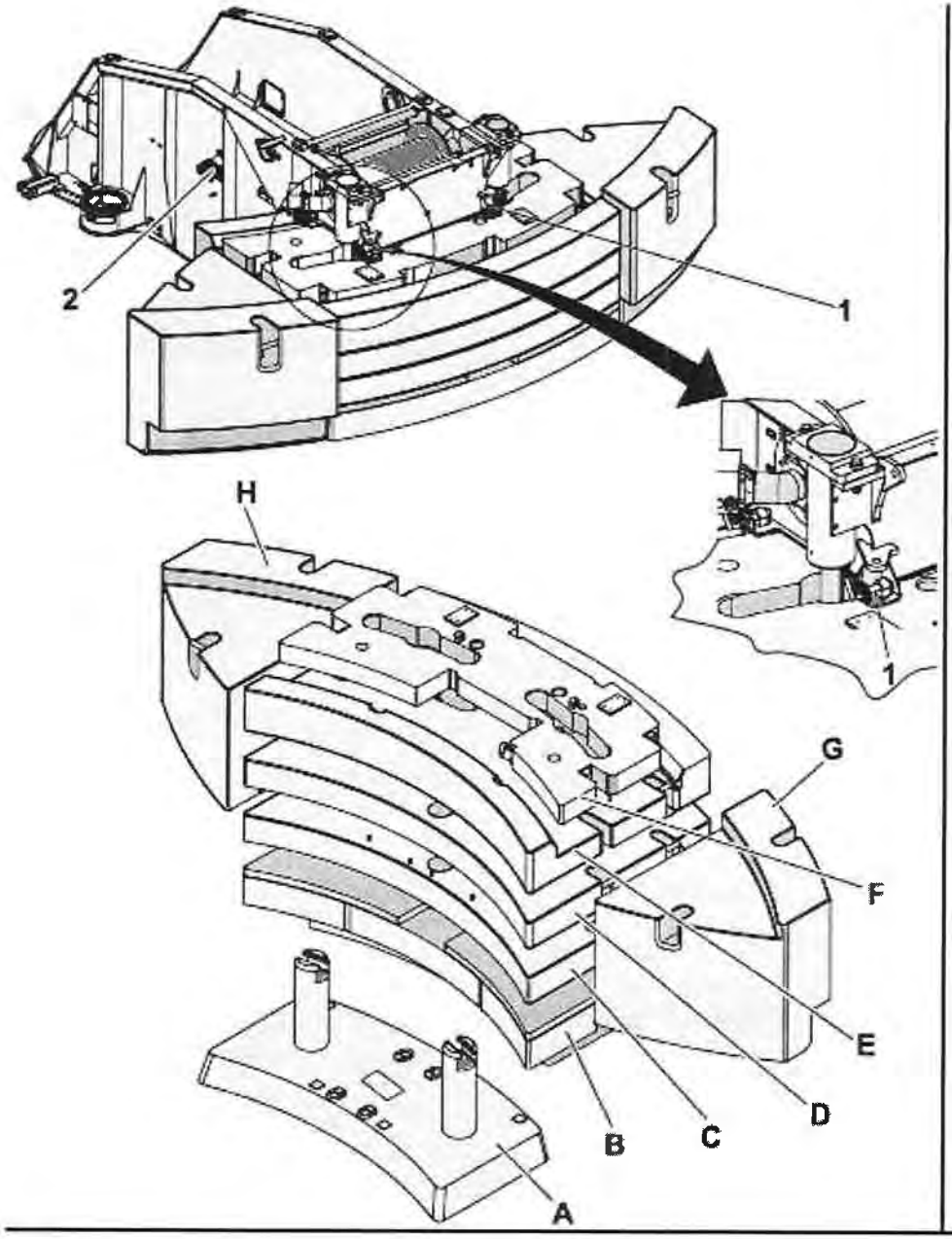
Rotate superstructure to 4.5°, **S:1.**

Actuate the button "counterweight downwards" until condition **S:2 is reached.**

Continue to rotate the superstructure on 0°, **S:3.**

Activate button "Counterweight up" until state **S:0 has been** reached and Release slew gear has been achieved.

*The fitting procedure is thereby completed. They are removed in a similar manner in the reverse sequence.*




**Mounting the Counterweight (F) to the Superstructure**

The section (**F**) **can either be assembled using an auxiliary** crane or your own crane.

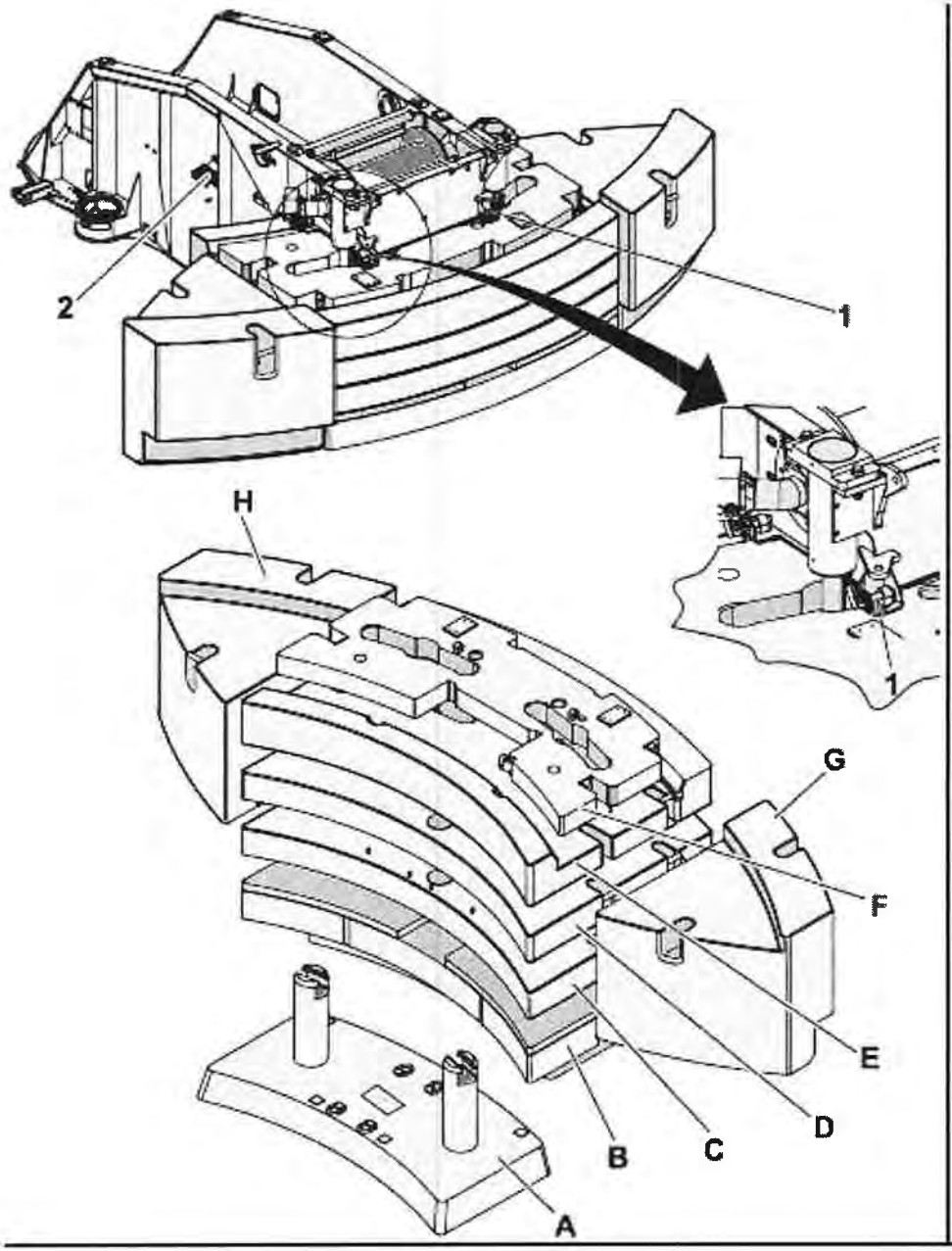
**Fitting with the auxiliary crane:**

**When fitting section (F) on the superstructure frame using the auxiliary crane, this must be attached diagonally with 2 chains, in order to avoid damage to the superstructure hydraulic tank.**

- Pin section (**F**) **on the superstructure frame using pin (1).**

**Assembly with your own crane:**

- Layer counterweight stack (**A - F) (counterweight combination** 43.5 t) on the counterweight support of the chassis.
- Fit the counterweight stack on the superstructure frame.
- To lock: remove pin (**1**) **from holder (2) and insert** in the pin eyelets of the section.
- Make sure that the pins are locked correctly.
- When the section is not pinned on the superstructure, the pins (**1**) **are inserted in the holder (2).**
- The section (**F**) **is dismantled in the same way** in the reverse sequence.




**Assignment of the Counterweights to the Different Configurations**

*As a rule, for driving (axle loads, transport condition) the requirements from section 6 of the operating instructions of the chassis must be observed. Other configurations as described in the following, may not be fitted, even when this is obviously possible. There is a considerable risk of damage to the crane's component group.*

**Counterweight Combination 0 t**

**(travel mode configuration, axle load version 12 t)**

For the counterweight combination 0 t, no counterweight elements are required to raise the permissible load in accordance with the load capacity tables.

This represents the road driving condition with the 12 t axle load.

Carrying the counterweight is then not permitted.

The swinging through radius on the superstructure from the centre of the slew ring to the rear edge of the superstructure frame is approx. 4170 mm.

**Counterweight Combination 5.7 t**

- only counterweight base plate (**A) on the superstructure for raising** loads.

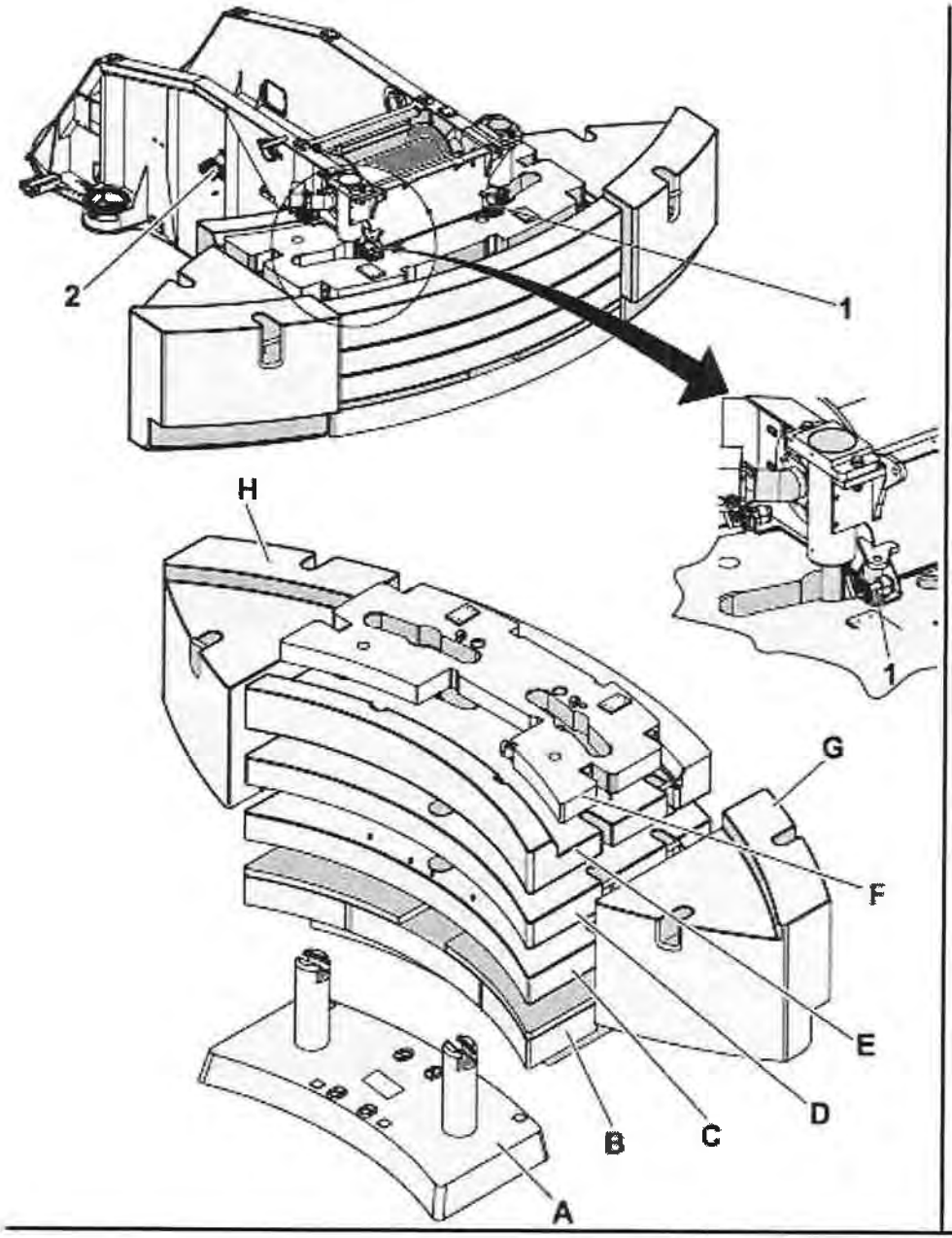
The slewing radius on the superstructure from the middle of the slew ring to the rear edge of the counterweight equals approx. 4450 mm.

**Counterweight Combination 8.9 t**

**(travel mode configuration, axle load version 14.5 t)**

**Travel mode configuration:**

-Counterweight base plate (**A) laid at the front on the chassis.- Section (F) pinned on the superstructure frame using pin (1).**




**Raising loads:**

Counterweights (**A and F) fitted on the superstructure frame.**

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4450 mm.

**Counterweight Combination 13 t**

Counterweights (**A and B) fitted for raising loads on the** superstructure frame.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight Combination 14.8 t**

Counterweights (**A and C) for raising loads fitted on the** superstructure frame.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight combination 16.3 t Configuration / axle load version 16 t**

**Travel mode configuration:**

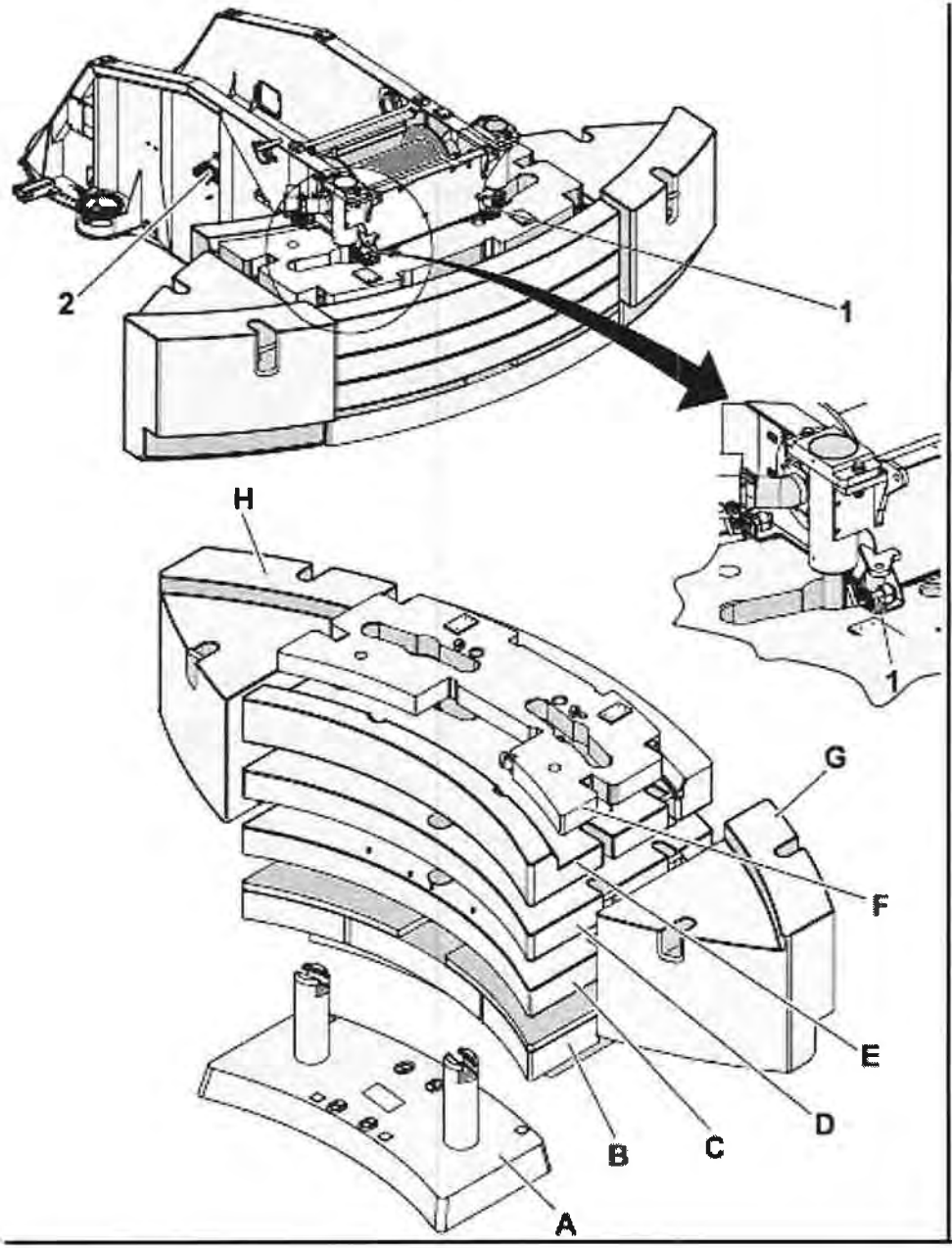
counterweights (**A) and (B) fitted at the front on the chassis.**

-Section (**F) pinned on the superstructure frame using bolt (1).**

**Raising loads:**

Counterweights (**A, B, F) fitted for raising loads on the** superstructure frame.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.




**Counterweight Combination 18.0 t**

Counterweights (**A, C and F) for raising loads fitted on the** superstructure frame. Section (**F) pinned on the superstructure** frame using bolt (**1).**

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight Combination 22.1 t**

Counterweights (**A, B, C) for raising loads fitted on the**

superstructure frame.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight Combination 25.3 t**

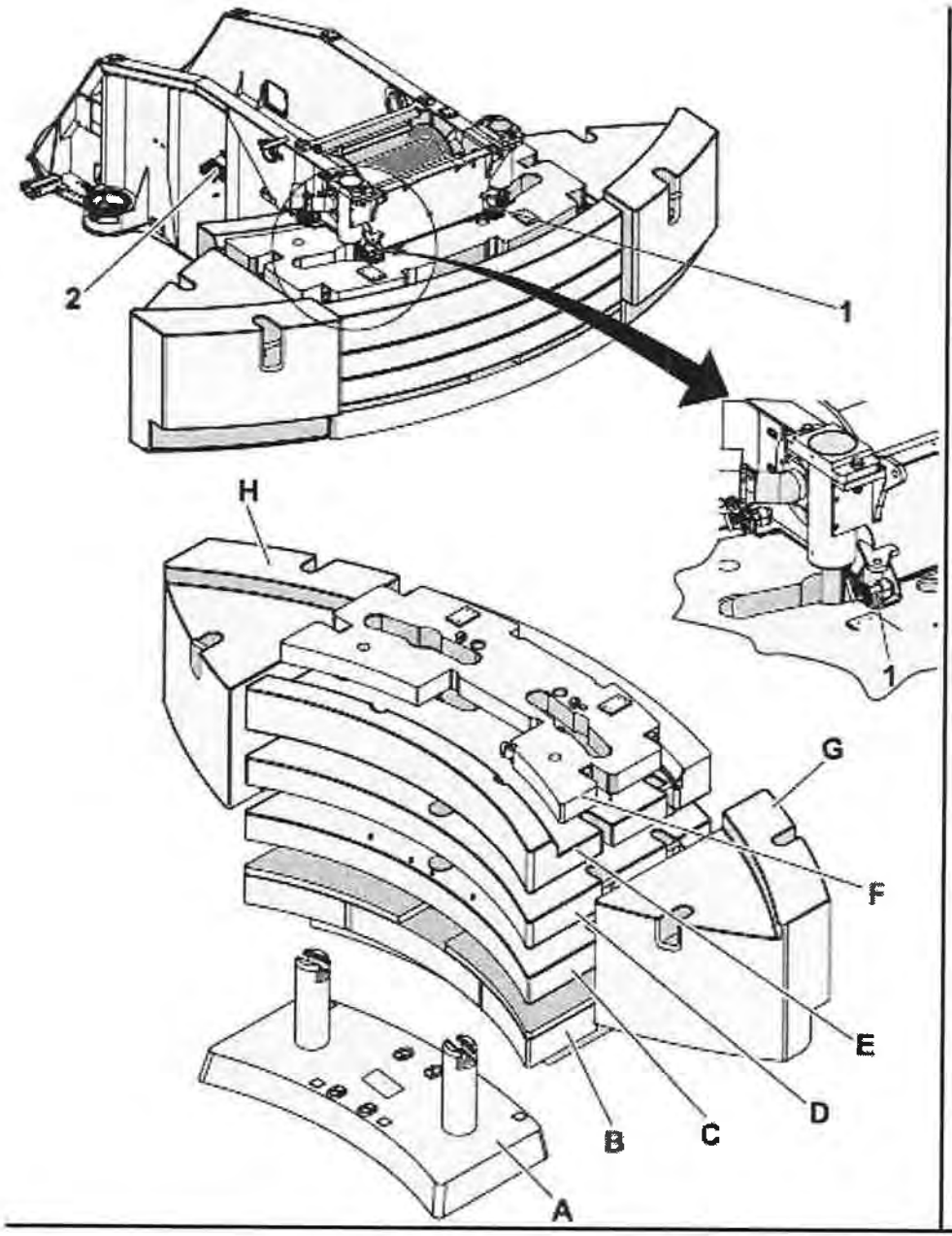
Counterweights (**A, B, C and F) (F pinned directly on the** superstructure frame) fitted on the superstructure frame for raising loads.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight Combination 31.1 t**

Counterweights (**A, B, C, D) for raising loads fitted on the** superstructure frame.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.




**Counterweight Combination 34.3 t**

Counterweights (**A, B, C, D and F) (F pinned directly on the** superstructure frame) for raising loads on the superstructure frame.

The swinging through radius on the superstructure from the center of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight Combination 40.2 t**

Counterweights (**A, B, C, D, E) fitted on the superstructure** frame for raising loads.

The swinging through radius on the superstructure from the centre of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight Combination 43.4 t**

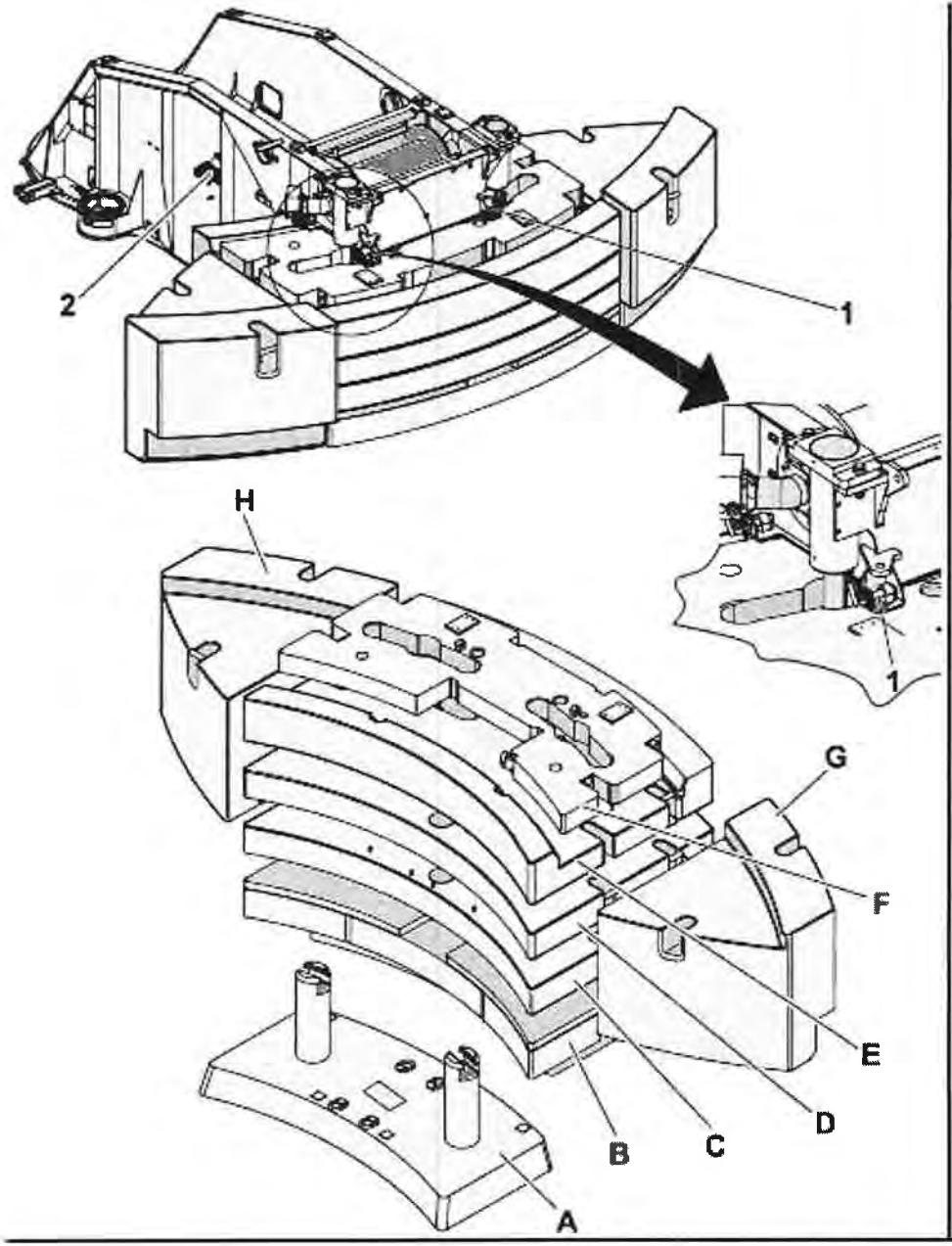
Counterweights (**A, B, C, D, E and F) fitted on the** superstructure frame for raising loads.

The swinging through radius on the superstructure from the centre of the slew ring to the rear edge of the superstructure frame is approx. 4800 mm.

**Counterweight combination 59.9 t (optional)**

Counterweights (**A, B, C, D, F, G and H) (F pinned directly on** the superstructure frame) fitted on the superstructure frame for raising loads.

The swinging through radius on the superstructure from the centre of the slew ring to the rear edge of the superstructure frame is approx. 4950 mm.




*The section (F) can be fitted either before or after attaching the saddle counterweights.*

To attach the saddle counterweights (**G) and (H) sections (C** and **D - are identical) must be fitted. The saddle** counterweights must be attached in the upper of the sections (**D).**

**Counterweight combination 69. 0t (optional)**

Counterweights (**A, B, C, D, E, F, G and H) fitted on the** superstructure frame for raising loads.

The swinging through radius on the superstructure from the centre of the slew ring to the rear edge of the superstructure frame is approx. 4950 mm.

To attach the saddle counterweights (**G) and (H) sections (C** and **D - identical) must be fitted. The saddle counterweights** must be attached in the upper of the sections (**D).**

*The sections **(E) and (F) can either be fitted before or after** attaching the saddle counterweights.*

**Operation with a Fitted Counterweight Combination**

**Due to physical reasons, the counterweight can sink slightly when fitted.**

**In order to avoid damage to the counterweight hoist and pin locking unit, you must check regularly whether the counterweight is still firmly fitted to the superstructure frame.**

**Otherwise, the electrical limit switch which releases superstructure slewing could "lose the signal" under unfortunate conditions.**

**This would result in the superstructure slewing movement locking.**

**In this case the counterweight must be pulled up to the superstructure frame again by activating the double button 18B, as described above.**


***NOTES;***