

Telescopic Camera Crane

S U P E R T E C H N O

22

Technocrane s.r.o.
Podnikatelska 19
CZ-30100 Plzen
Czech Republic
Tel. + 420 – 377 889 111
Fax + 420 – 377 889 100
e-mail: info@supertechno.com
www: supertechno.com

Emergency contacts:

For mechanical questions or for spare parts:
martin@supertechno.com
Martin Martinovsky: + 420 – 602 45 28 92

For questions on electronic or for spare parts:
jan@supertechno.com
Jan Kucera: + 420 – 602 34 53 76

Manual

Part 1

Safety information

Part 2

Mechanics

Part 3

Electronics (printed version only)

Part 4

Connectors

Supertechno, Techno15 and Technodolly are the registered and protected trademarks of Orion s.r.o./Technocrane s.r.o.

The camera cranes described here are protected by the following patents:

DE 3815342 C1

EU 02015890.3 (EP 1298087)

US no. 10/254,029

Contents

| | |
|---|-----------|
| Part One..... | 6 |
| Safety information | 6 |
| 1.1. Safety straps..... | 7 |
| 1.2. Leveling jacks | 10 |
| 1.3. Securing the counterweights | 11 |
| 1.4. Securing the beam sections..... | 12 |
| 1.5. Cleaning and maintenance | 13 |
| 1.6. Protective covers..... | 13 |
| 1.7. Outside shooting | 13 |
| Second part..... | 14 |
| Mechanics | 14 |
| 2.1. Dolly | 14 |
| 2.1.1. Leveling jacks | 14 |
| 2.1.2. Fitting the leveling jacks..... | 15 |
| 2.1.3. Leveling of the dolly..... | 16 |
| 2.1.4. Pushbars | 17 |
| 2.2. Tracks and track wheels..... | 19 |
| 2.2.1. Laying of tracks | 19 |
| 2.2.2. Attaching the track wheels..... | 21 |
| 2.2.3. Moving the dolly..... | 22 |
| 2.2.4. Securing the track ends | 24 |
| 2.3. Column | 25 |
| 2.3.1. Mounting onto the dolly | 25 |
| 2.3.2. Inserting the center cable | 28 |
| 2.3.3. Installing the column on a camera car | 29 |
| 2.3.4. Extending the telescopic column | 30 |
| 2.3.5. Horizontal friction clamp..... | 35 |
| 2.3.6. Vertical friction clamp | 36 |
| 2.3.7. Attaching the cables..... | 38 |
| 2.4. Beam sections | 39 |
| 2.4.1. Removal of the transparent protective covers | 39 |
| 2.5. Rollers..... | 41 |
| 2.5.1. Quiet and smooth movement | 41 |
| 2.6. Drive cables | 47 |
| 2.6.1. Tensioning the drive cables | 47 |
| 2.6.2. Tensioning the motor drive belt..... | 52 |
| 2.7. Counterweights | 53 |
| 2.7.1. Balancing the crane..... | 53 |
| First step: | 53 |
| The different various counterweights are attached in accordance with the following table:If | 54 |
| 2.8.1. Attaching the autohorizon gear..... | 59 |
| 2.9. Z-head | 60 |
| 2.9.1. Attaching the remote head | 60 |
| 2.9.2. Attaching the camera | 62 |
| 2.9.3. Balancing the camera (tilt)..... | 64 |
| 2.9.4. Adjusting to the camera size..... | 68 |

| | |
|--|-----|
| 2.9.5. Assembly of the third axis (roll)..... | 69 |
| 2.9.6. Balancing the camera in the third axis (roll) | 70 |
| First step: | 70 |
| Second step: | 71 |
| Third step: | 71 |
| 2.9.7. Wiring..... | 72 |
| 2.10. Electronics unit | 74 |
| 2.10.1. Assembly of the electronics unit..... | 74 |
| 2.10.2. Connecting..... | 76 |
| 2.10.3. Switching on | 79 |
| 2.10.4. Automatic cut-out | 81 |
| 2.10.5. Error numbers | 82 |
| 2.11. Speed box..... | 84 |
| 2.11.1. Introduction..... | 84 |
| 2.11.2. Assembly of the speed box | 85 |
| 2.12. Telescope hand control | 88 |
| 2.12.1. Operating | 88 |
| 2.14 Desk | 91 |
| 2.14.1. Assembly | 91 |
| 2.14.2. Connecting..... | 95 |
| 2.14.3. Switching on | 95 |
| 2.14.4. Hand-wheels | 96 |
| 2.14.5. Joystick | 97 |
| 2.14.6. Focus and zoom | 99 |
| 2.14.7. Roll | 100 |
| 2.14.8. Potentiometer panel | 104 |
| 2.16. Pan bars..... | 105 |
| 2.16.1. Transportation..... | 105 |
| 2.16.2. Assembly | 105 |
| 2.16.3. Connecting leads..... | 113 |
| 2.16.4. Operation | 114 |

Part One

Safety information

Preliminary remarks

Camera cranes operate in accordance with the counterbalance principle of a “seesaw”. In other words, the camera is fixed on one side of a beam (arm) and counterweights are attached to the other side. Obviously if there’s no camera, or there are no counterweights, the seesaw will be out of balance. This can prove very hazardous. So to avoid potential dangers, careful attention must always be paid to the forces at work on the camera crane: the counterweights exert loads of up to 500 kg, and the crane weighs as much as 1.2 t. Only when they are in a state of balance can these forces be properly controlled.

Important safety precautions

1.1. Safety straps

When not in use, or during transport, the crane should always be secured by two safety straps – one at the front and one at the back. On the dolly, fasten the safety straps with snap hooks at the eyebolts. On the crane, pull the straps through the holes provided. This prevents the straps from slipping off under strain or becoming detached unintentionally.



1.1.a - Snap hook at eyebolt on dolly



1.1.b - Strap at front hole



1.1.c - Strap at back hole

Do not use only one safety strap when the crane is being transported, assembled or parked. In these situations one side of the crane is much heavier than the other and the straps hold down the heavy side. Since it is not clear which side happens to be heavier, the safety straps must always be attached on both sides.

But even when the straps are attached to the dolly, the crane can still be brought out of balance if, for instance, the telescopic beam is fully extended without having the counterweights attached. The crane can still tip forwards or backwards even with the safety straps in position. In other words, the straps in themselves do not ensure balance in every situation.

Only when the camera is attached to the crane and the crane is perfectly balanced with counterweights for every length, may the safety straps be released. Once the straps are off, the camera operator must keep hold of the crane. Whenever the operator leaves the crane, he must first ensure that the safety straps are re-fastened.



1.1.d - ST22 with straps

1.2. Leveling jacks

The dolly is set horizontally by adjusting the leveling jacks. To place the crane on the largest possible footprint, attach the leveling jacks to the dolly wheels. Since the dolly wheels can turn in different directions, the steering at the front and rear of the dolly must be first be locked before setting down the leveling jacks.



1.2. - Locking steering

1.3. Securing the counterweights

The counterweights should always be secured by their retaining bolts to prevent them falling off.



1.3. - Putting M16 hexagon head at counterweights

1.4. Securing the beam sections

During transportation the beams might extract themselves and extend outwards. Avoid this danger by ensuring that the beam sections are fully retracted and then secured with the small ratchet strap. Do NOT attach the ratchet strap to the auto horizon gear.



1.4.a - Strap between beams



1.4.b - Strap at autohorizon – don't use like this

1.5. Cleaning and maintenance

The crane should never be cleaned when the electronics are switched on. To clean and service the crane it is necessary to put one's hands into the beams, so if there is any unintended telescopic movement of the beams a serious accident could occur. And make sure that no one else manually pushes the beam in or out; this could also cause injury to the person servicing the beam.

1.6. Protective covers

There is always a danger of someone gripping the crane beam and having their hands cut off by the moving sections. It is therefore forbidden to work with a crane without the plastic protective covers being fitted. The protective covers should only be removed for servicing and cleaning the tracks and rollers, and must always be screwed back on afterwards.



Important: *BEFORE REMOVING THE PLASTIC PROTECTIVE COVERS ALWAYS SWITCH OFF THE ELECTRONICS AND PULL OUT THE PLUG FROM THE POWER SOCKET TO PREVENT ANY RISK OF THE CRANE MOVING UNINTENTIONALLY AND INJURING SERVICE PERSONNEL.*

1.7. Outside shooting

If the crane is extended to its full reach and, furthermore, the arm is directed upwards, gusts of wind at open-air locations can threaten the crane's stability.

Do not work in a wind stronger than force three (3 Beaufort or 20 km/h = 15 mph)

Second part

Mechanics

2.1. Dolly

2.1.1. Leveling jacks

We generally recommend that the leveling jacks be used. They give the basic balance to the dolly. The crane is more stable when the jacks are mounted than when it is simply resting on the pneumatic wheels. Furthermore, it is unsafe to operate the crane when it is not perfectly level in both axes.



2.1.1. - Dolly with jacks

2.1.2. Fitting the leveling jacks

The leveling jacks are fitted by pushing them into the hollow shaft of the wheel and tightening the nut on the inside of the wheel assembly.



2.1.2.a - Jack moving into wheel



2.1.2.b - Nut putting on the jacks

2.1.3. Leveling of the dolly

Before leveling the dolly the steering must be locked by screwing down the locking pin.



2.1.3.a - Locking steering

The dolly should be leveled evenly using all the jacks. If only one side is jacked the dolly will tilt excessively.



2.1.3.b – Moving jacks up

2.1.4. Pushbars

The pushbars can be inserted in the dolly at the front or at the rear. The upper pushbar can be attached symmetrically in the middle but also to one side if preferred.



2.1.4.a - Top pushbar in the middle



2.1.4.b - Top pushbar to one side

2.1.5. Pressure in wheels

| | |
|--------------------------------|----------------|
| Dolly | 630 kPa |
| Counterweights trolleys | 300 kPa |
| Desk | 300kPa |

2.2. Tracks and track wheels

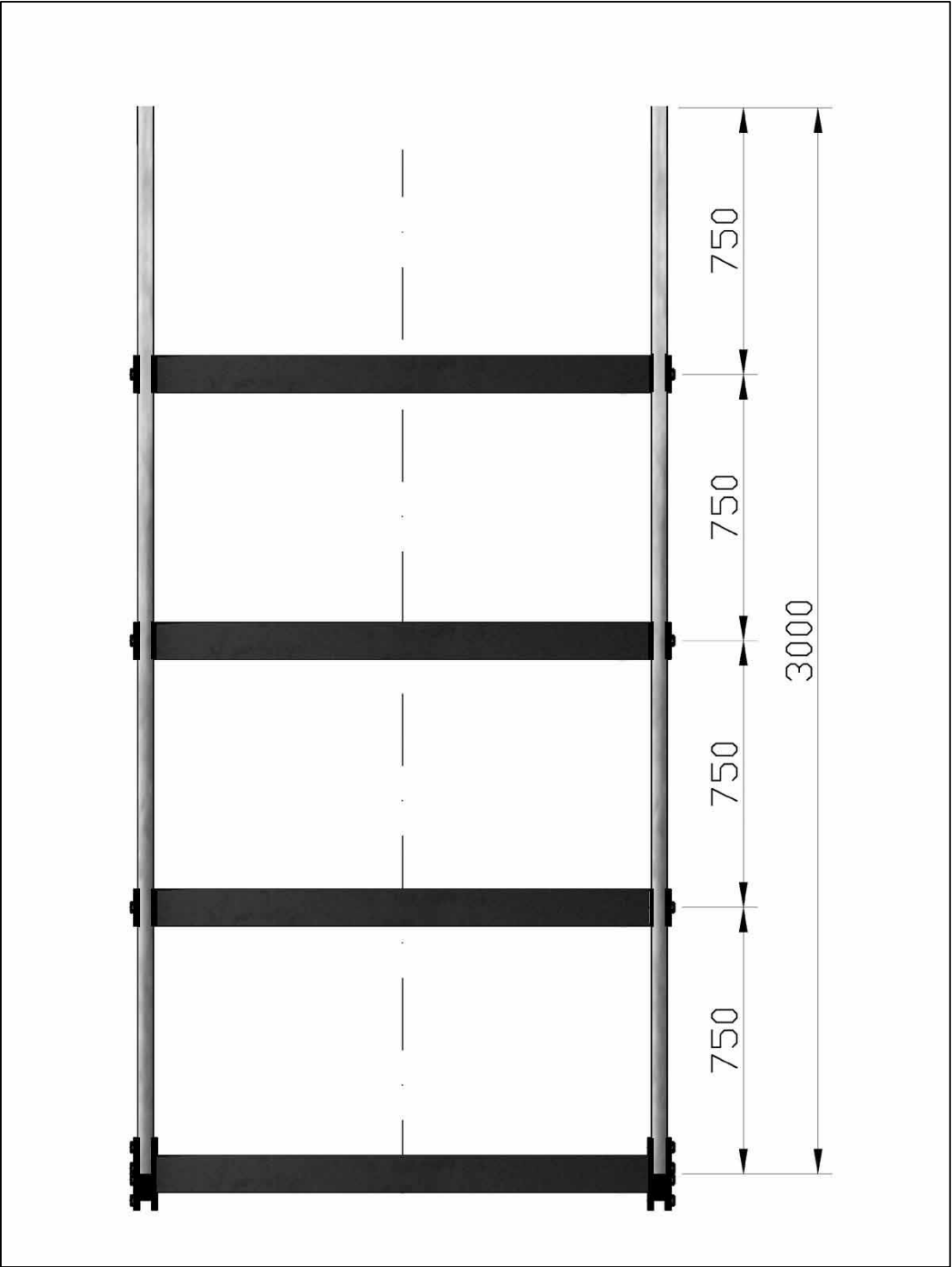
2.2.1. Laying of tracks

The track sections are attached to each other with a pressure clamp on the cross-ties (sleepers). Make sure there are no gaps along the rails.



2.2.1.a - Locking two tubes with the double clamp

It is very important that the tracks are laid horizontally and securely. The track support must be sturdy and stable so that the entire weight of the crane (1300 kg) is securely supported. Check after several movements to make sure that the track support has not become loose or shifted position.



2.2.1.b – One section of the tracks

2.2.2. Attaching the track wheels

The track wheels are mounted using two screws for each wheel truck.



2.2.2. - Fixing the screws

2.2.3. Moving the dolly

First the starter ramps must be laid on the sleepers. The dolly is then slowly rolled onto the tracks.



2.2.3.a - Dolly moving onto the ramps

Make sure that the track wheels are seated properly on the tracks before the pneumatic wheels are moving down the ramp.



2.2.3.b - Track wheels moving on tracks

2.2.4. Securing the track ends

The ends of the track must be secured to prevent the dolly unintentionally rolling off. A buffer must be fixed at both ends.



2.2.4. - Fixing buffer

2.3. Column

2.3.1. Mounting onto the dolly

The column is mounted onto the dolly by means of four nuts.

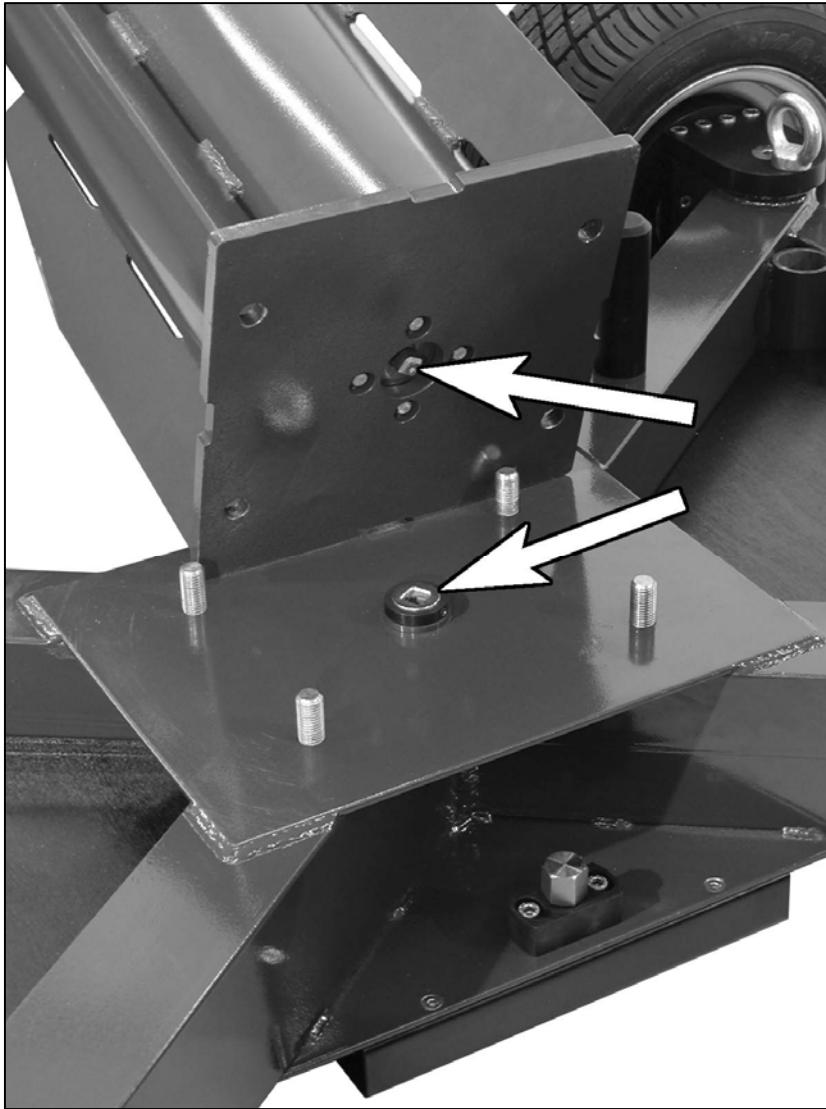


2.3.1.a - Placing column onto the dolly



2.3.1.b - Nuts being fitted

When installing the column, it is important to make sure that the square shaft socket on the dolly engages properly with the square receiver in the column.



2.3.1.c - Square shaft socket on dolly and square receiver in column

2.3.2. Inserting the center cable

In the crane's tilt axis there is a sensor which automatically controls the camera horizon. For this to work, the center cable, which links the sensor and the electronics unit, must be plugged in.



2.3.2 - Center cable

2.3.3. Installing the column on a camera car

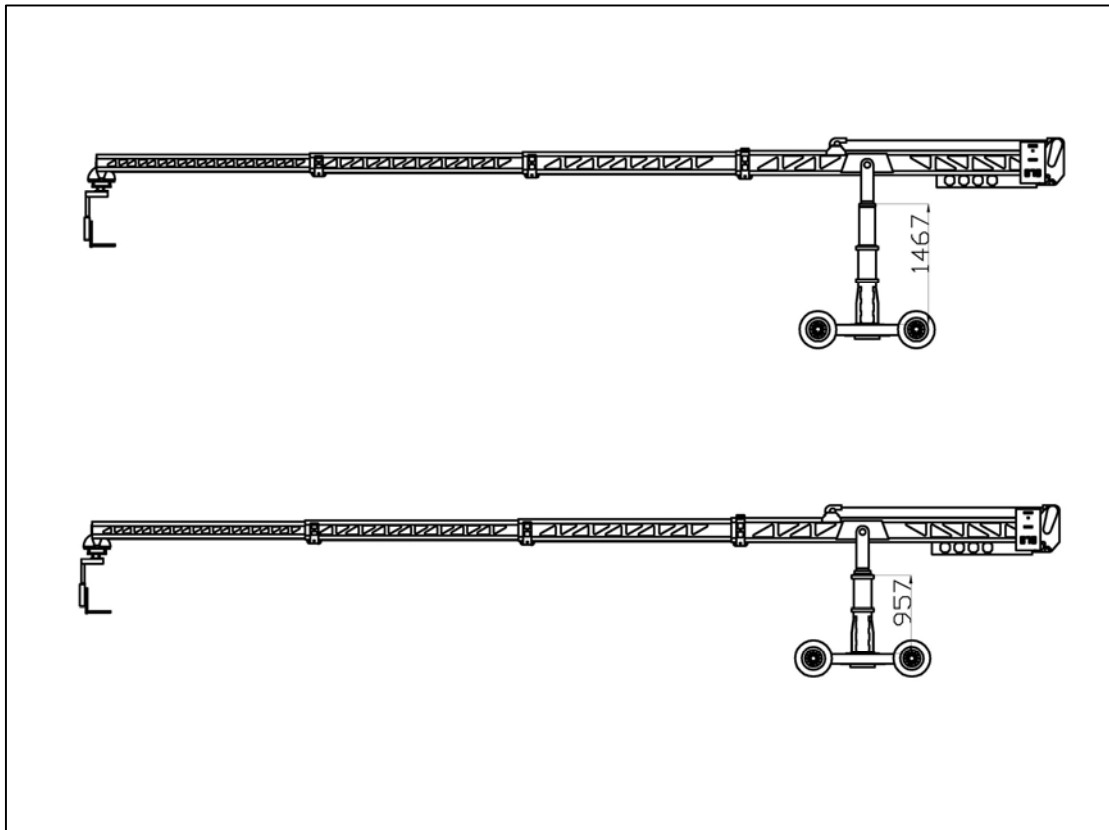
Straps should be attached to the eye-bolts on the column to give it additional stability when used on a camera car.



2.3.3 - Four eye screws with snap hooks

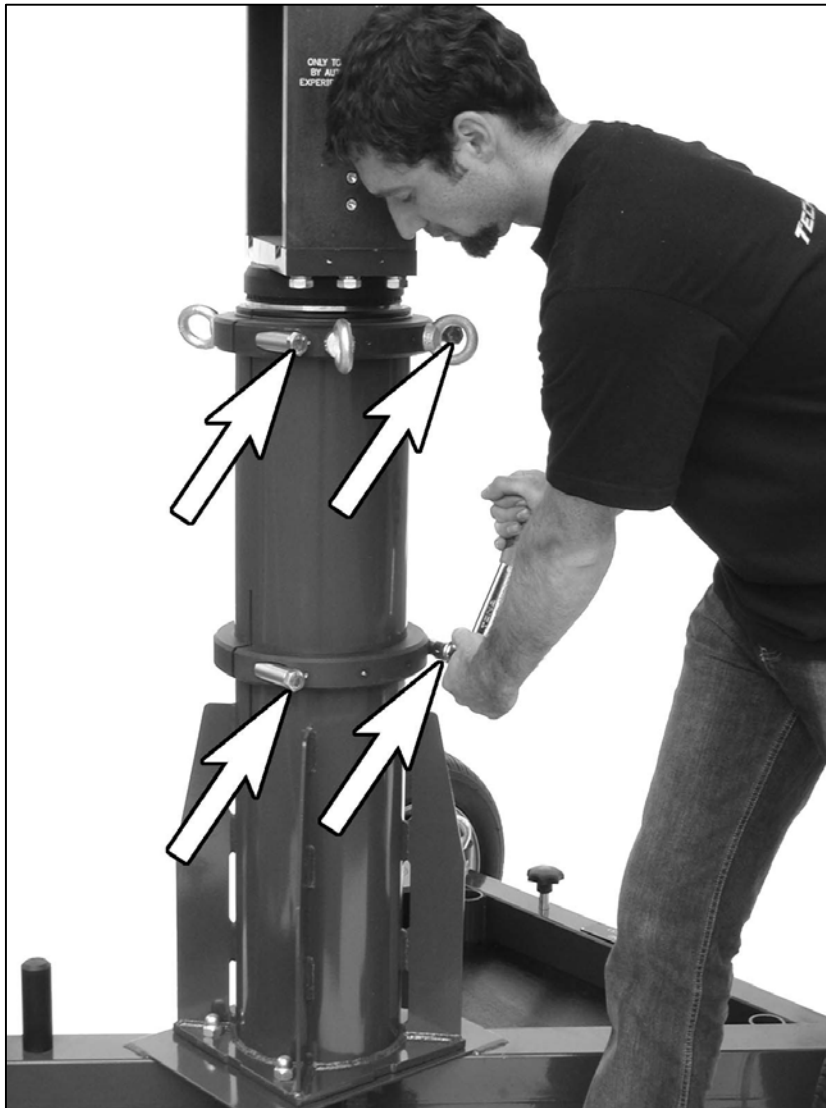
2.3.4. Extending the telescopic column

The crane is mounted on a telescopic column which can be raised 40 cm on a spindle. This upward extension allows the crane to be tilted higher, giving the operator an additional camera lens height of 2 meters.



2.3.4.a - Drawings of the crane extended, one with column in, one with it out

First the four screws on the locking rings must be loosened.



2.3.4.b - Opening screws

Then the horizontal crane brake must be locked.



2.3.4.c - Locking the horizontal brake

Then the inner column can be raised or lowered with a 24 mm ratchet or by using battery-powered drill.



2.3.4.d - Battery-powered drill moves column

Caution: Do not use drive the inner column with excessive force against its mechanical buffer plate. To prevent this, do not use a mains-supplied power drill because this can destroy the buffer plate.

When brought to the desired height, the four screws on the locking rings must be re-tightened so that the inner column is clamped firmly into the outer column.



2.3.4.e - Locking screws

2.3.5. Horizontal friction clamp

The horizontal friction clamp is located at the top end of the inner column and is tightened with a 24 mm spanner.



2.3.5. - Locking pan brake

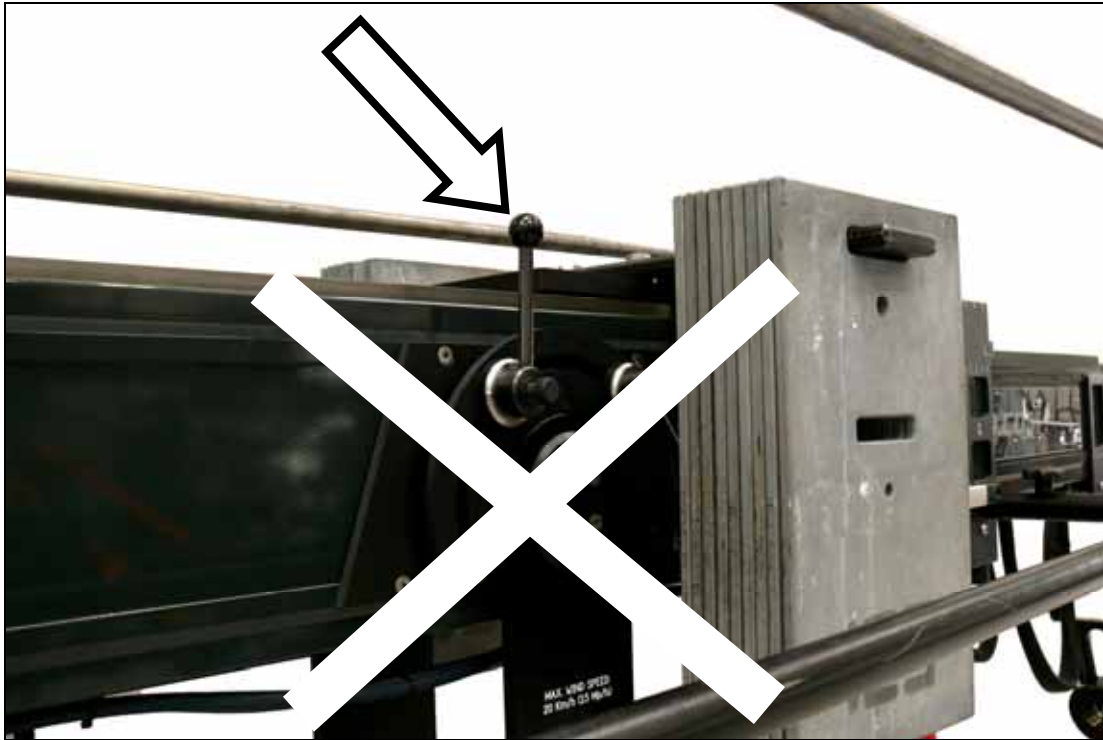
2.3.6. Vertical friction clamp

Friction can be introduced into the tilt axis by turning the two levers.



2.3.6.a - Locking tilt brakes

Caution: Do not leave the handle in the upright position, because it could be broken off by the counterweight carriage as it passes.



2.3.6.b - Carriage moving against handle

2.3.7. Attaching the cables

It is important that all cables leading away from the crane have sufficient slack. This prevents the plugs in the electronics unit from being pulled out.



2.3.7. - Recommended fixing points for cables

2.4. Beam sections

2.4.1. Removal of the transparent protective covers

The plastic protective covers have to be removed from the beam sections to enable servicing and cleaning. It is usually sufficient to remove only the side covers.



Important: BEFORE REMOVING THE PLASTIC PROTECTIVE COVERS ALWAYS SWITCH OFF THE ELECTRONICS AND PULL OUT THE PLUG FROM THE POWER SOCKET TO PREVENT ANY RISK OF THE CRANE MOVING UNINTENTIONALLY AND CAUSING INJURY TO SOMEONE.

To take off the protective covers first loosen the fastening screws by one turn. The covers can then be shifted sideways and removed.



2.4.1.a — Screw being crewdriver is loosened screw



2.4.1.b — Taking off the plastic shield*Plastic is taking off*



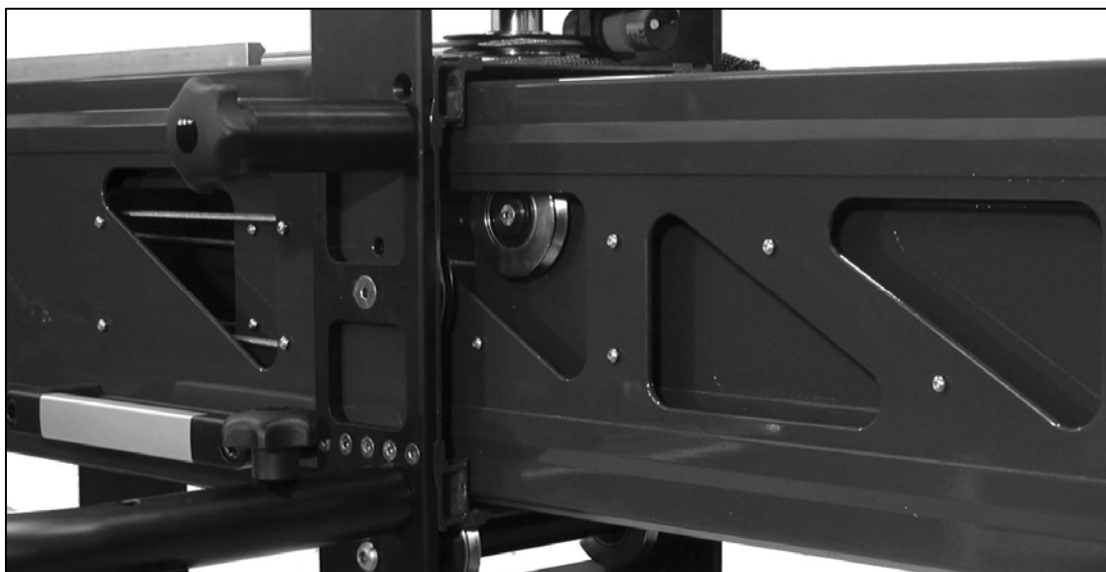
Important: AFTER EVERY SERVICE ALWAYS REPLACE THE PLASTIC PROTECTION SHIELDS. THERE IS ALWAYS A DANGER THAT PERSONNEL OR MEMBERS OF THE PUBLIC WILL TOUCH THE CRANE BEAM AND INJURE THEIR HANDS ON ITS MOVING SECTIONS.

When the plastic protective covers have been put back into position do not turn the screws too tight. This might damage the protective covers.

2.5. Rollers

2.5.1. Quiet and smooth movement

Outside and inside tracks are attached to the beams. The beam sections telescope by running on inner and outer rollers on along these tracks.



2.5.1.a - Inner rollers



2.5.1.b - Outer rollers

A quite quiet and smooth sliding movement, which is essential for perfectly smooth camera work, depends on having requires clean and lubricated tracks and rollers. First anyAny dirt must first be carefully removed from the tracks and rollers with a fat-dissolving degreasing cleaning agent.



2.5.1.c - Cleaning tracks



2.5.1.d - Cleaning rollers

Then a thin fine film of grease is applied (using a brush for best results) to the tracks.



2.5.1.e — Greasing the tracks with a bBrush is putting grease on tracks

When cleaning it is important not to forget the inside tracks, even though they are less accessible. They carry the same load as the outside tracks and are therefore equally important for smooth movement.



2.5.1.f – Cleaning inside tracks

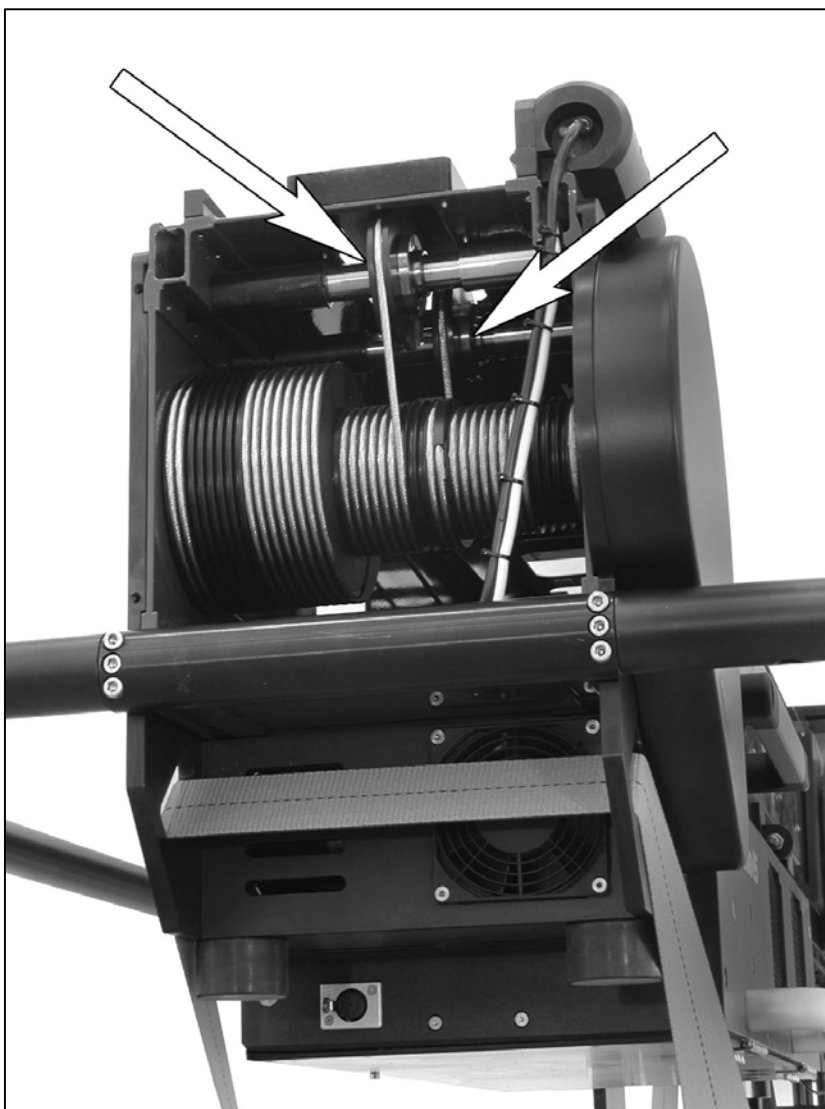
It is also important to clean at the same time the tracks on along which the counterweight carriage is riding on the first beam. These tracks carry a moving load of 600 200 kg. Any dirt will cause slight vibrations that are transferred to the film image.



2.5.1.g - Cleaning the counterweight tracks



Important: Relubricate two sliding rollers shafts every three month.



2.5.1.h – Sliding rollers

2.6. Drive cables

2.6.1. Tensioning the drive cables

The beam sections of the telescopic crane are extended and retracted by a cable mechanism. To ensure there is no play in the movement of the beam sections, all six four cables must be evenly tensioned on their anchorages.



2.6.1.a - Anchorage pull in/out cable (2nd beam section)



2.6.1.b - Anchorage pull out and in cable (3rd beam section)



2.6.1.d - Anchorage pull in cable (2nd beam section)



2.6.1.e - Anchorage pull in cable (3rd beam section)

To tension the cables hold the threaded anchor bolt steady with a 6mm sanner and tighten the nut with a 13mm spanner.



2.6.1.dg – Tightening cable

The cables have the correct tension if they are still quite taut when the crane has been tilted up at 60 degrees.



Important: AFTER TENSIONING THE CABLES ALWAYS SECURE THE NUT ON THE ADJUSTING BOLT WITH THE LOCK-NUT.



2.6.1.ge – Securing nut

2.6.2. Tensioning the motor drive belt

The motor drive belt is kept taut by an eccentric pulley. Having removed the belt cover, slightly loosen the fastening screws in the middle of the pulley with an emery key. Turn with an Allen key and then move the eccentric axle with a 19mm spanner until the belt has no play. The fastening screws can then be tightened up again with the emery key.



2.6.2 - Moving Adjusting the eccentric pulley

2.7. Counterweights

2.7.1. Balancing the crane

On a crane of fixed length the camera is mounted and then the counterweights are successively added until the crane is balanced. In the case of a telescopic crane, the counterweight carriage slides inwards and outwards to balance to the crane at every length. For this reason the initial balancing of a telescopic crane is significantly different:

First step:

First make sure that the beam is secured by the two ratchet straps.



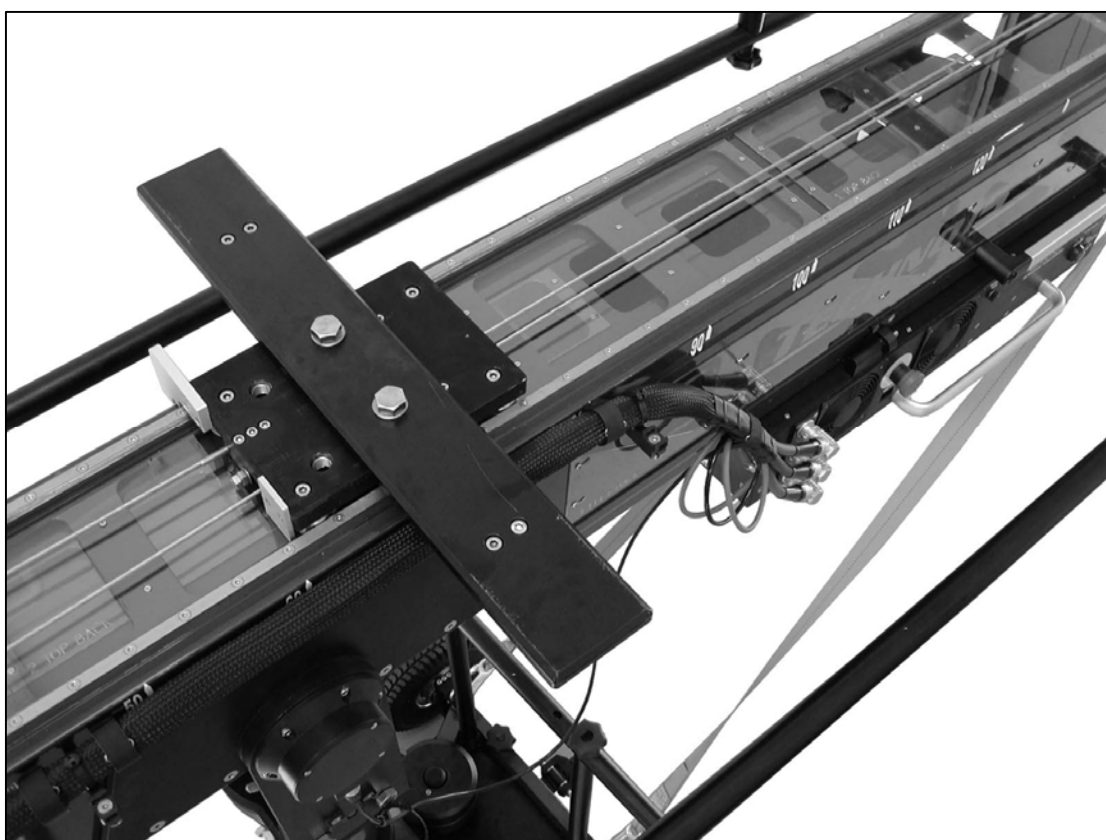
2.7.1.a – ST22 with straps

Second step:

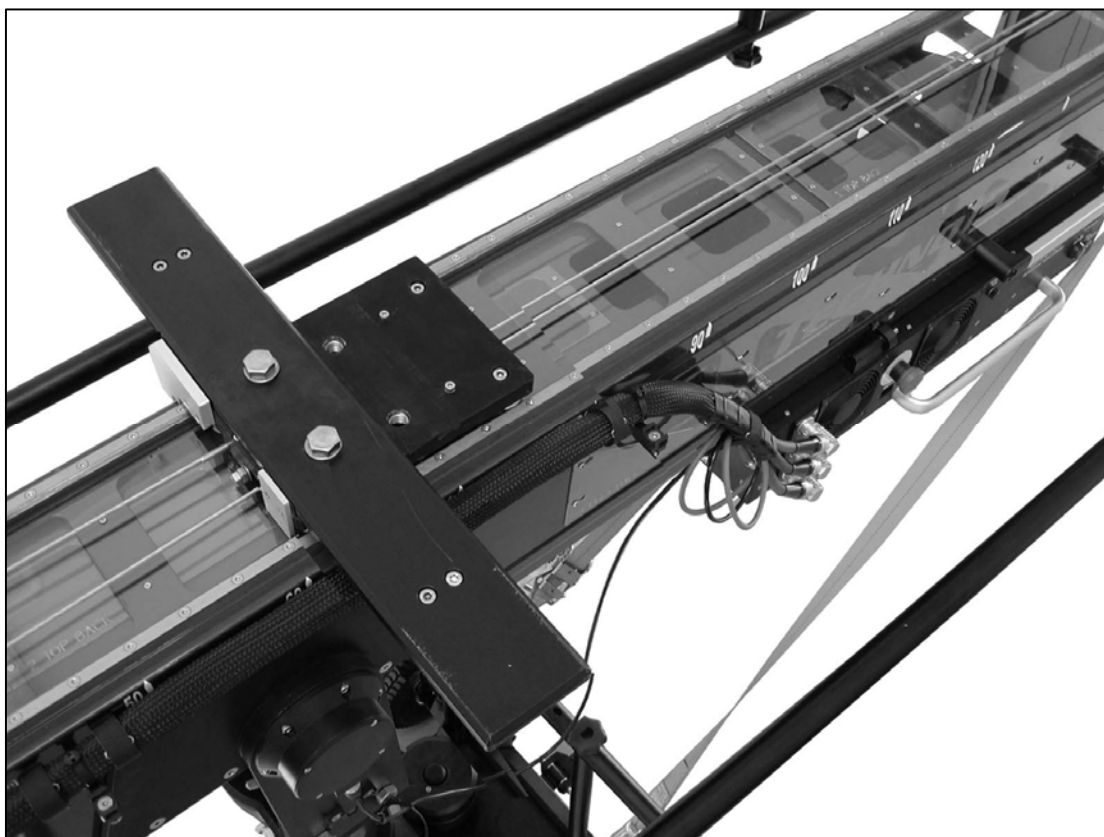
With tThe crane is fully retracted, the . The camera, with all its accessories and wires attached, is mounted on the remote head.

Third step:

The different various counterweights are attached in accordance with the following table:If using a light camera, attach the counterweight bridge at the front of the counterweight carriage. **If using a heavy camera, attach the counterweight bridge in the middle of the counterweight carriage.**

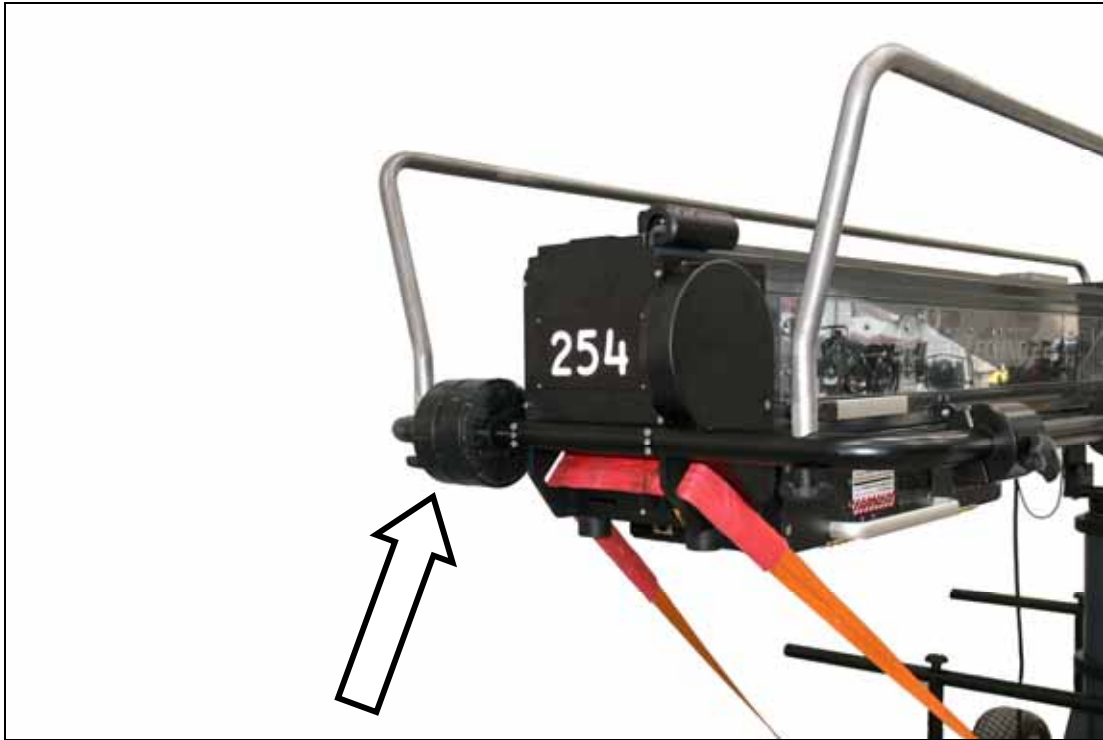


2.7.1.b. – Bridge in the middle



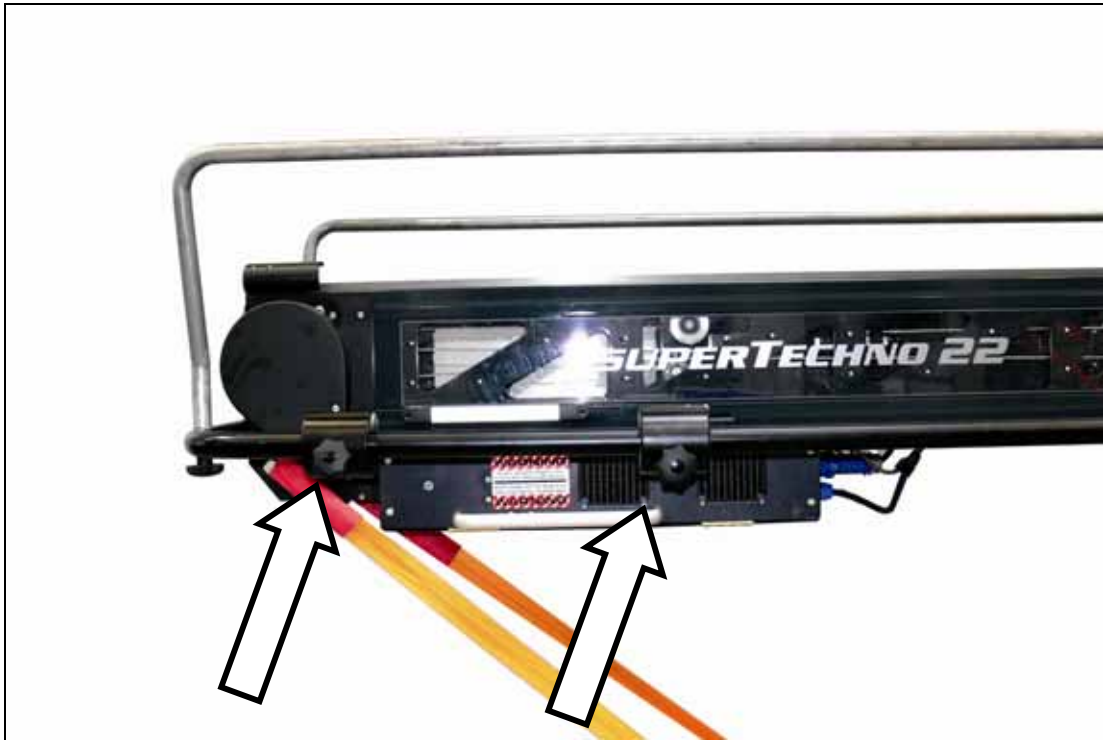
2.7.1.c. – Bridge at front

The fine adjustment of the position of the weights on the counterweight carriage is done by turning the four adjusting nuts using a 36 mm spanner.

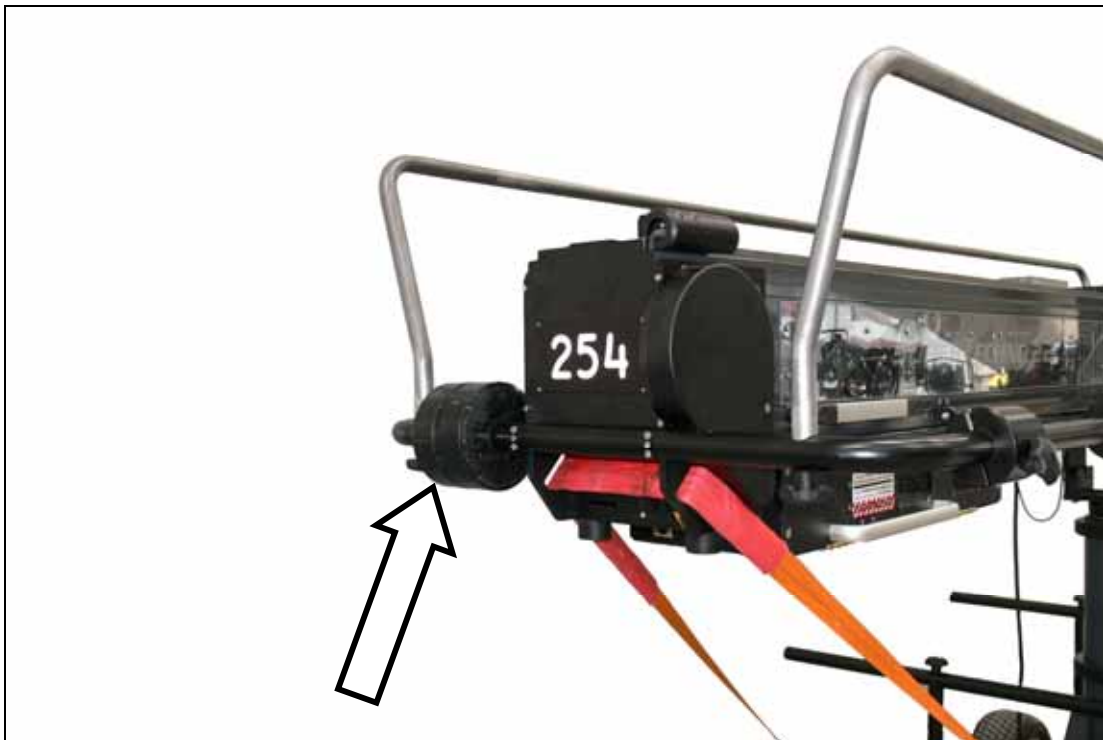


2.7.1.b - Moving Adjusting the carriage

With the aid of the moveable weights the crane can now be finely balanced in its retracted state.



2.7.1.dc - Sliding weights on crane



2.7.1.ed – Two donuts at the back of the crane

Final step:

Slowly extend the beam. If the crane is heavier at the front, whole or smaller weights should be added to counterweight carriage.

If the crane is heavier at the rear, whole or smaller weights should be taken off the counterweight carriage.

This procedure is repeated until the crane is perfectly balanced along the full length of its movement.

2.8. Autohorizon

2.8.1. Attaching the autohorizon gear

The autohorizon is mounted on the end beam section with 8 screws. By releasing all 8 screws the autohorizon can be easily removed.



2.8.1. - 4 Four screws on the right

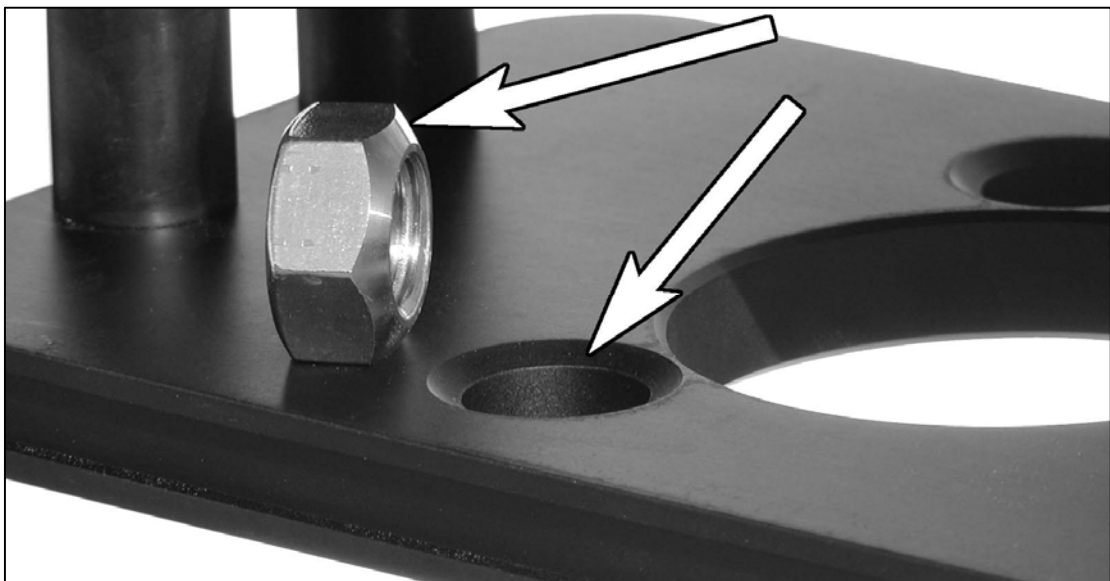
2.9. Z-head

2.9.1. Attaching the remote head

The remote head is bolted on by tightening three nuts through the Mitchell base plate on the auto horizon. Make sure that the rounded side of the nut fits into the countersink at the hole.



2.9.1.a – Mounting head



2.9.1.b - Detail of nut and hole

The remote head can be leveled using the three threaded bolts.



2.9.1.c – Leveling the head

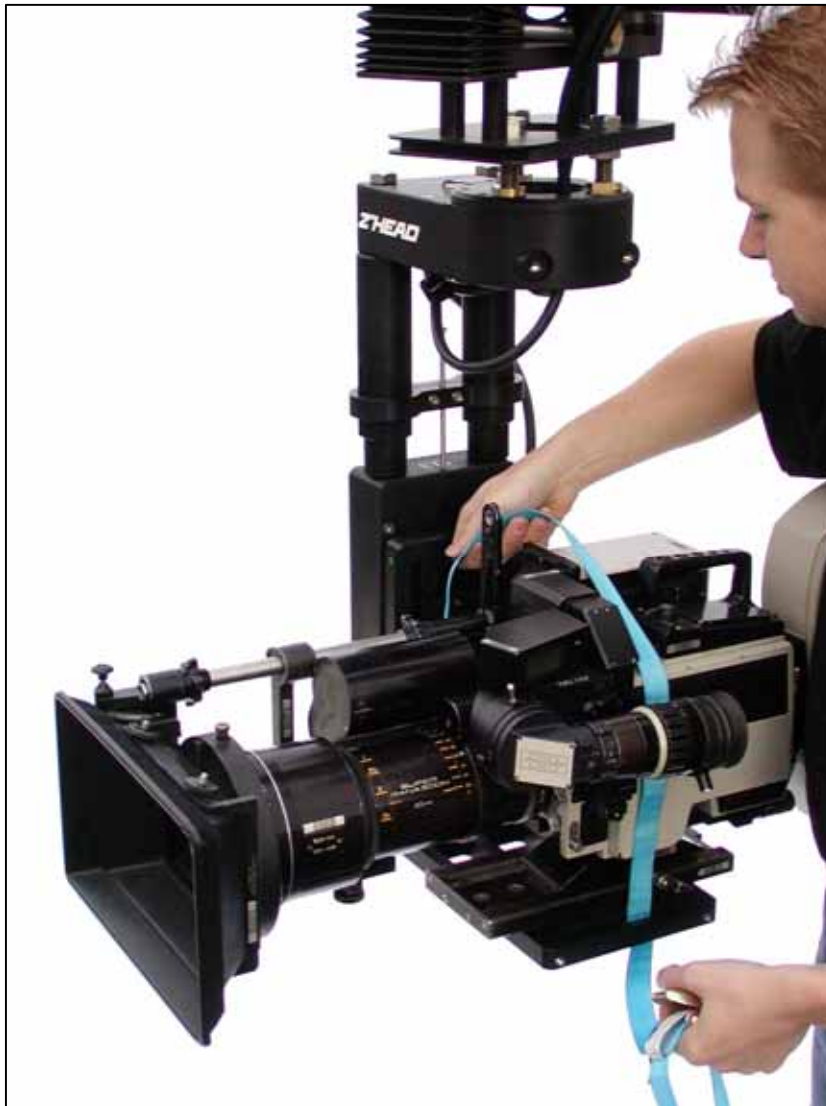
2.9.2. Attaching the camera

The camera's base plate is attached to the remote head with two 3/8" screws.



2.9.2.a - Mounting camera at base plate

The camera must also be secured with a non-flammable safety belt to prevent it from falling. This would not only harm the camera and anybody or anything beneath it, but would also cause the crane to become unbalanced with potentially disastrous consequences.

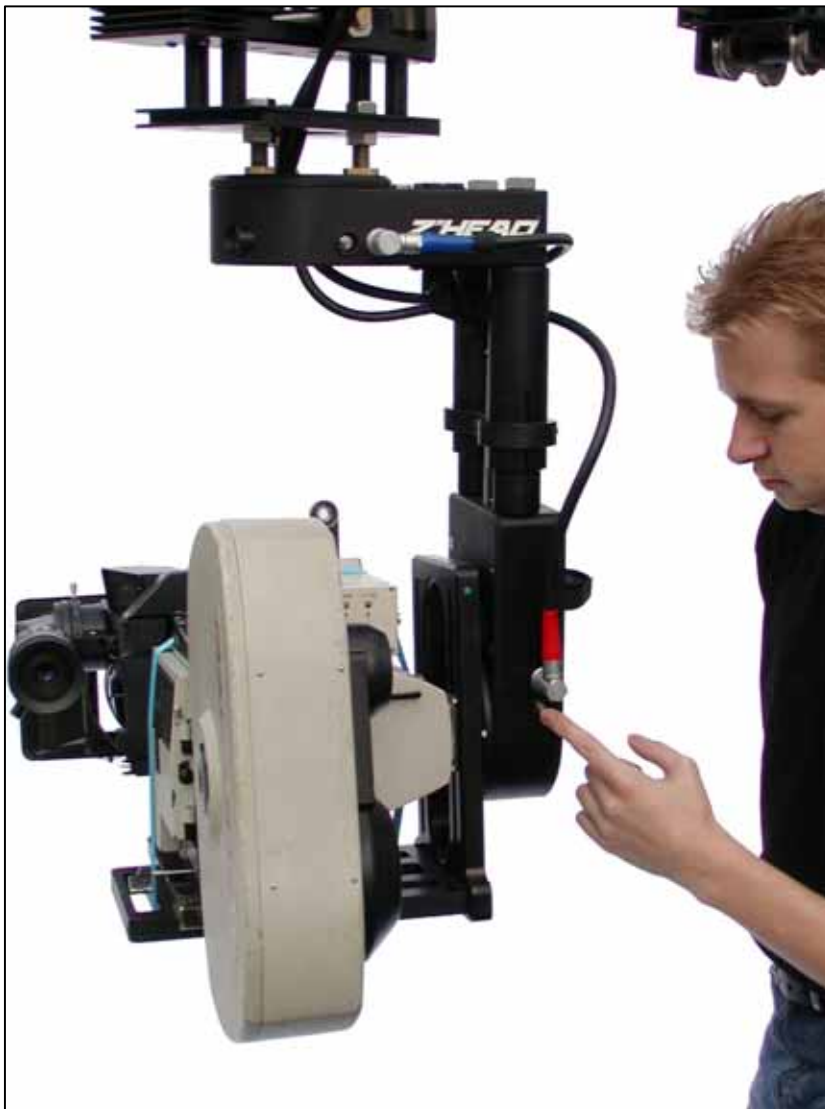


2.9.2.b - Securing the camera with a strap

2.9.3. Balancing the camera (tilt)

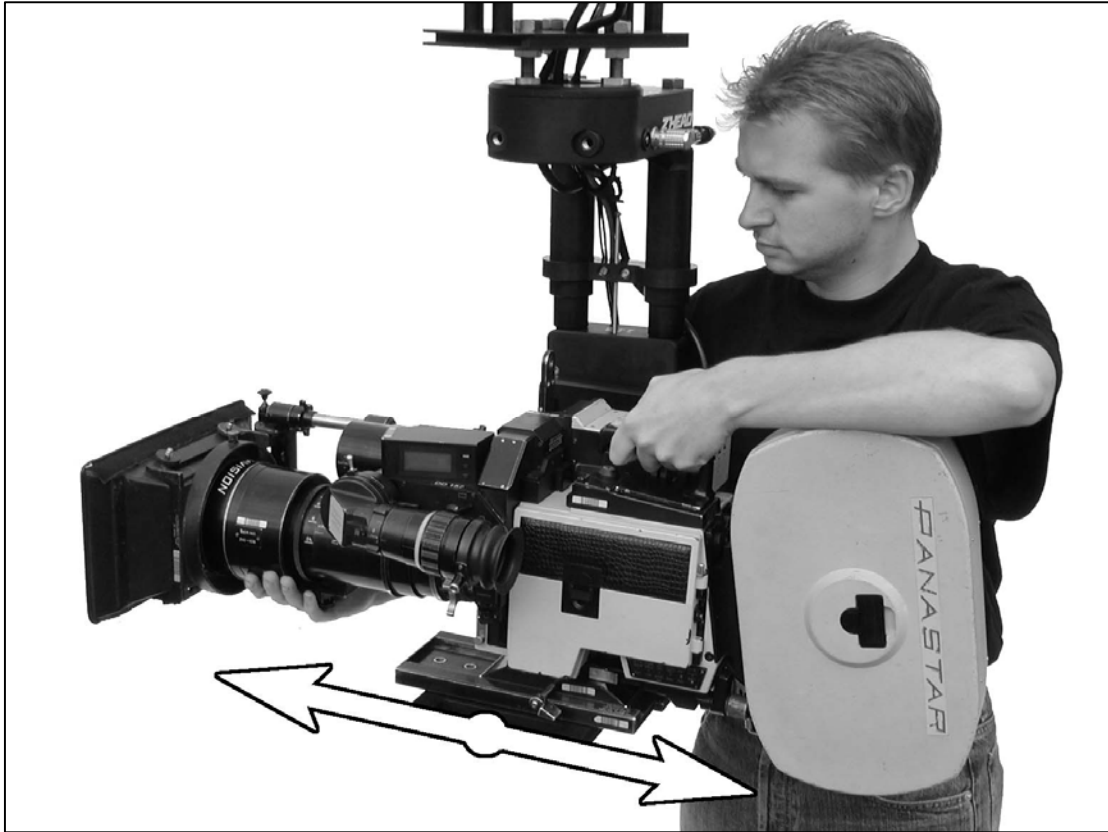
The camera must be attached to the remote head as close to its center of gravity as possible. The camera can be slid back and forth to find this point.

The remote head can be moved freely by switching off the crane's power or by disengaging each head motor



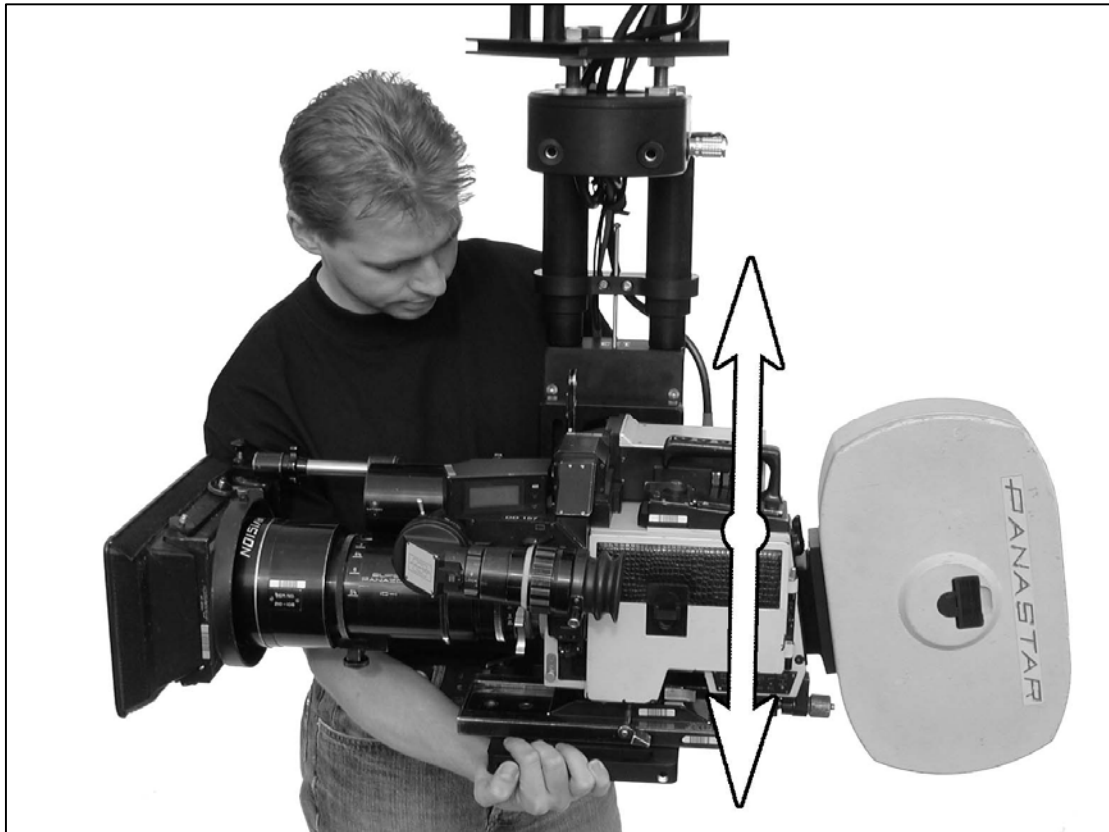
2.9.3.a - Finger at switcher

First slide the camera back and forth on the camera plate until the camera remains horizontal (find its horizontal center).



2.9.3.b - Moving camera back and forth

Then raise and lower the camera on the vertical adjustment plate until the camera remains balanced and stationary at all tilt angles (find its vertical center).



2.9.3.c – Moving camera up and down



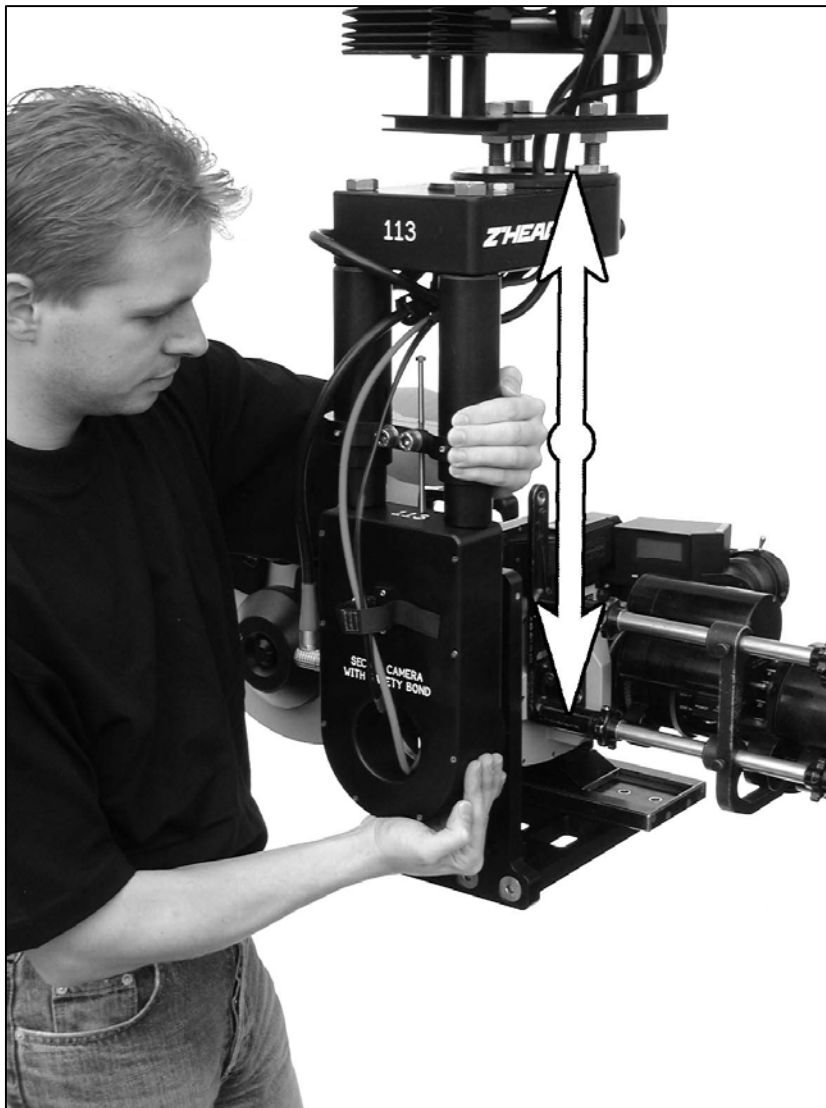
Important: Make sure that the fastening bolts for each pan, tilt and roll section are the right length for the depth of the plates and have the corresponding color-coded markings. If the wrong screws are used and they are too long, they may protrude and damage the ball bearings.



2.9.3.d - Screw at plate – note: protrusion max. 10 mm

2.9.4. Adjusting to the camera size

After the camera has been balanced, the Z-head is adjusted to the size of the camera in use. Open the clamping jaws of the slide pipe and slide the camera to the point where a 360 degree tilt is still possible. It is very important that both sides of the cage be adjusted evenly, if a two-sided cage is being used. The more compactly the remote head is assembled; the better is the performance of the camera.



2.9.4. – Moving raiser up and down

2.9.5. Assembly of the third axis (roll)

The third axis is attached to the tilt unit with four screws.



2.9.5. - Assembling roll unit

2.9.6. Balancing the camera in the third axis (roll)

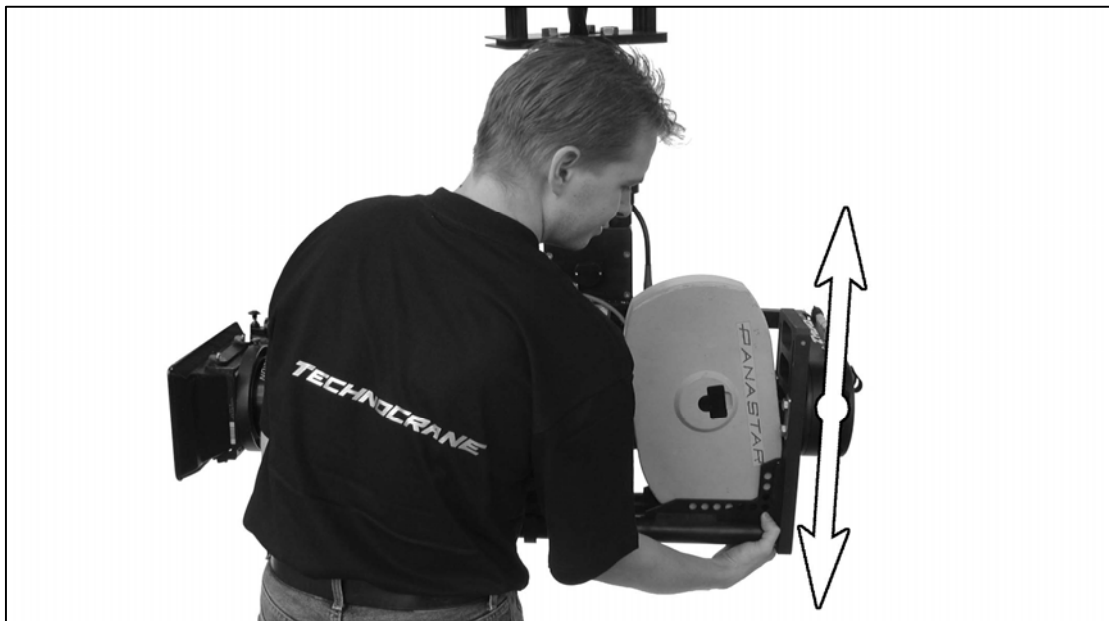
The remote head is equipped with three axes, so balancing must begin with the third axis (roll), after which the tilt axis can be balanced.

First step:



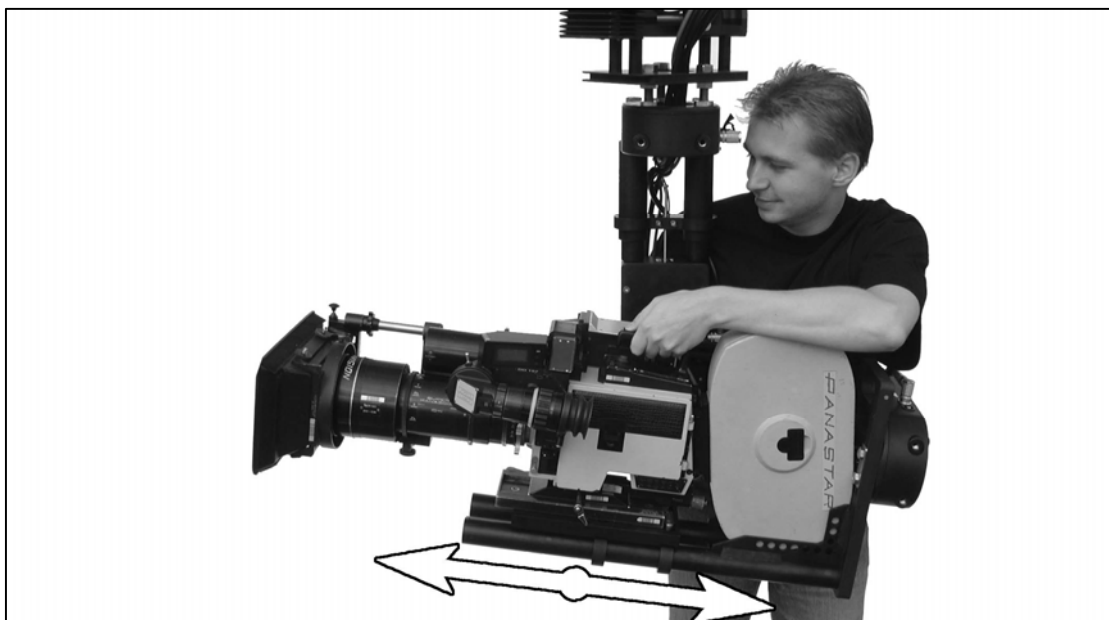
2.9.6.a - Camera moving on roll left and right

Second step:



2.9.6.b – Camera moving up and down

Third step:



2.9.6.c – Camera moving back and fore

2.9.7. Wiring

The remote head can turn three times on its pan, tilt and roll axis. To avoid any damage to the wiring, all electrical cables must be passed through the hollow axles and secured to the fixing points.



2.9.7.a - Cables at pan, tilt and roll



2.9.7.b - Recommended fixing points for cables

2.10. Electronics unit

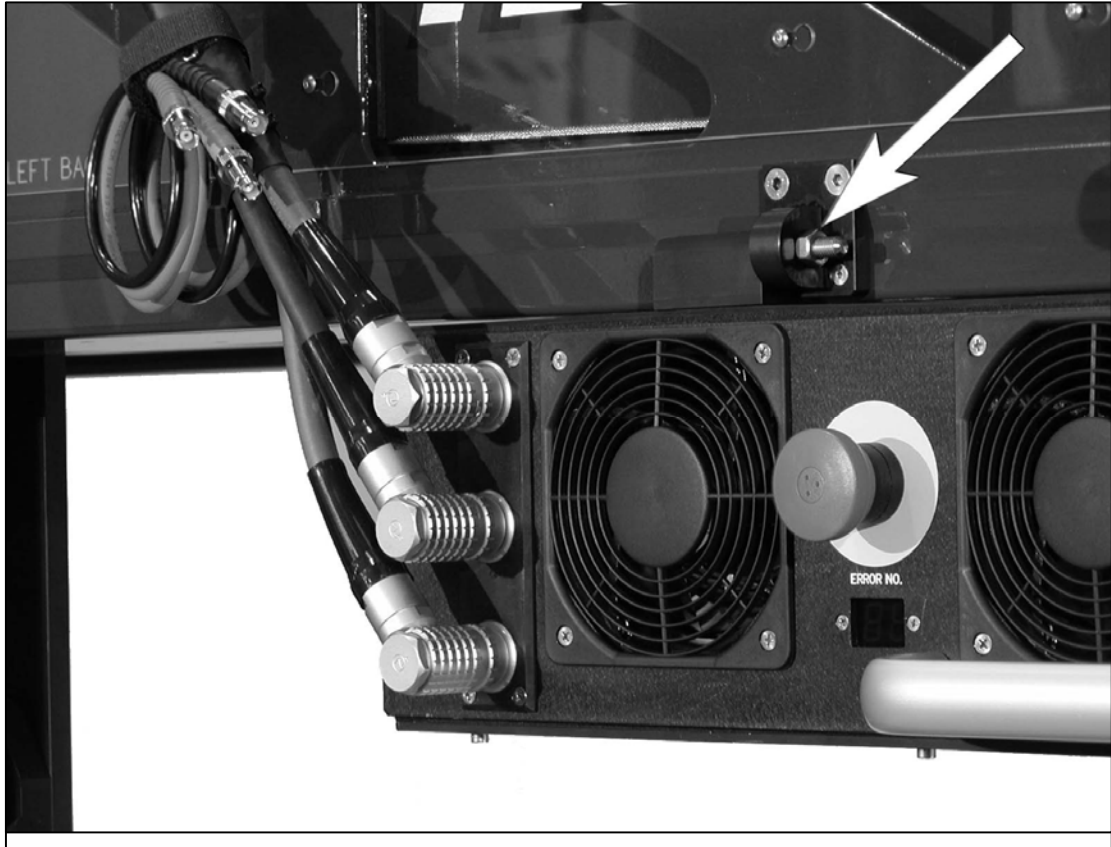
2.10.1. Assembly of the electronics unit

The electronics unit should be lifted by at least two people and carefully fitted into the mounting holes and guides.



2.10.1.a - Lifting unit into crane

The unit must then be secured in position using the two safety nutsscrews.

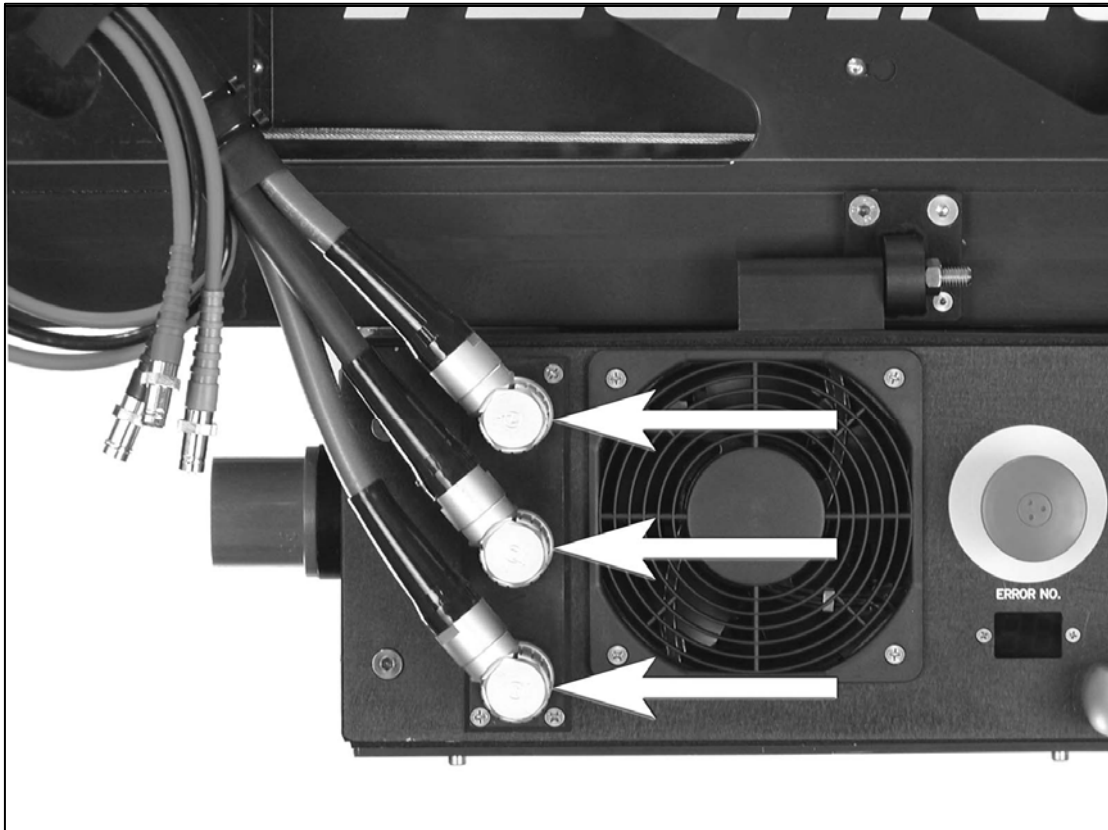


2.10.1.b - Safety nutsscrew

2.10.2. Connecting

The following plugs must be inserted:

- a. the three main plugs (Lemo right angle plugs)



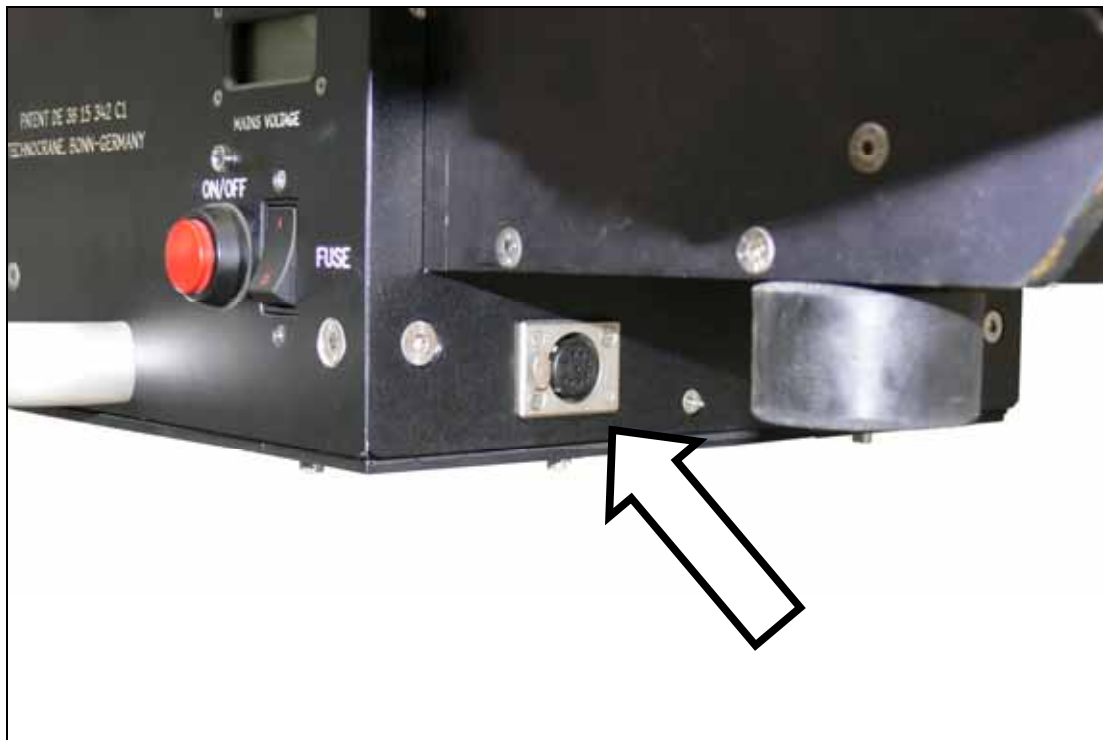
2.10.2.a - Three lemos

- b. the CEE mains connector
- c. the desk connector (BNC)
- d. the centrecenter cable (XLR 3 pole)
- e. 1st speed box connector (Speacon connector)
- f. 2nd speed box connector (XLR 7 pole)



2.10.2.b - Front side of unit

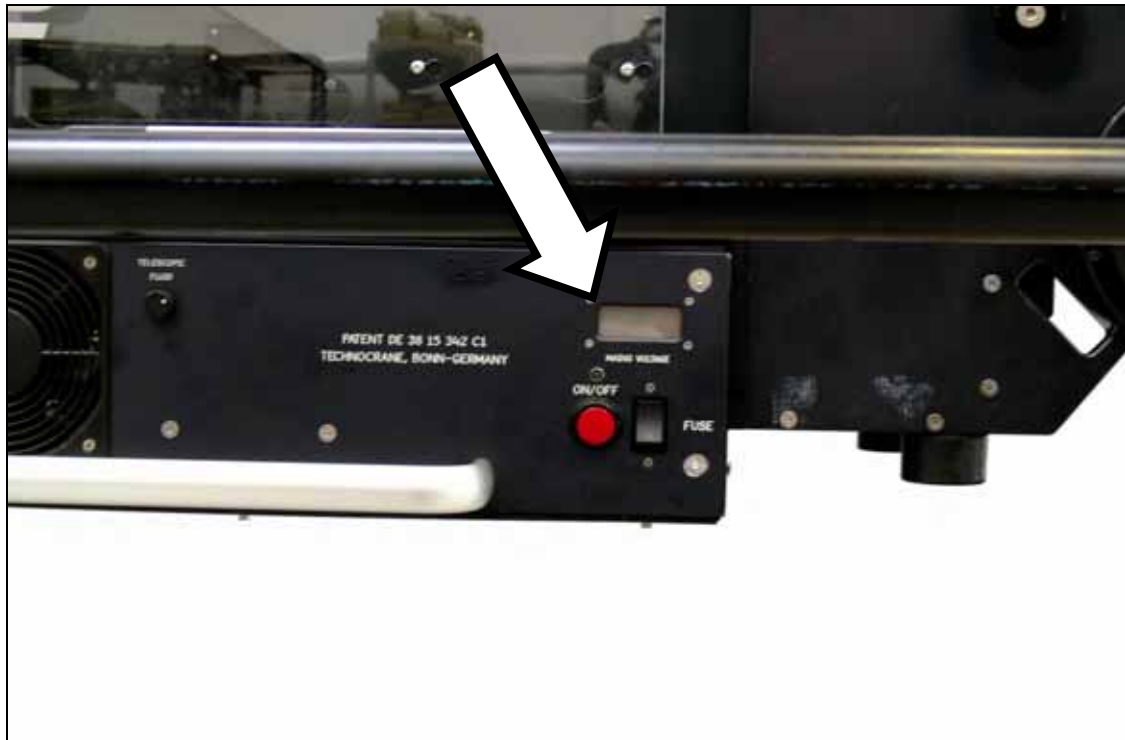
e. the hand control connector (XLR 7 pole)



2.10.2.c - Back side of unit

2.10.3. Switching on

First of all the main fuse is activated with the rocker switch. The voltmeter shows the voltage from the mains supply. If power supply is less than 200 volts, find a stronger source. Also check whether the problem arises because the connecting cable is too long or its wires too thin.



2.10.3.a - Display at unit

Also check that the emergency cut-off button has not been pressed.



2.10.3.b - Emergency button out

The crane can then be switched on with the green starter switch. It is operational after about 4 seconds, as soon as the LED on the auto horizon has stopped blinking. If the LED continues to light up, the BNC connection to the control desk or to the pan bars has not been properly connected or is interrupted.

2.10.4. Automatic cut-out

The electronics contain a “watchdog” board which automatically switches off the system when various operating errors or defects occur. The reasons for the a cut-out are indicated by the error code display.



2.10.4.a - Error code display

2.10.5. Error numbers

- 01 Pan out at range in positive direction
- 02 Pan out at range in negative direction
- 03 Pan overcurrent
check: Cable snapped?
Checkcheck: Head-cage caught crane-beam?
- 11 Tilt out of range in positive direction
- 12 Tilt out of range in negative direction
- 13 Tilt overcurrent
check: Cable snapped?
check: Camera correct balanced?
- 21 Roll out of range in positive direction
- 22 Roll out of range in negative direction
- 23 Roll overcurrent
check: Cable snapped?
check: Camera correct balanced?
- 30 Autohorizon:
 - Tachometer cable broken
 - Motor blocked**check: Autohorizon gear has small play in every degree?**
check: Head-cage caught crane-beam?
- 31 Autohorizon:
 - Tachometer cable broken
 - Motor blocked
 - Amplifier error**check: like 30**
- 32 like 30
- 33 like 31
- 34 Telescope:
 - Tachometer cable broken
 - Motor blocked**check: Too much friction in beam**
check: End sensors are working and correct adjusted?

-
- 35 Telescope:
- Tachometer cable broken
 - Motor blocked
 - Amplifier error
- check: like 34**
- 36 like 34
- 37 like 35
- 40 Emergency push-button pressed at desk
- 51 Off-push-button pressed at autohorizon
- 52 OFF button pushed at the telescope joy
- 53 Overtemperature at heatsinks
- check: Are fans working?**
- check: Is heatsink clean and not covered?**
- 54 Overtemperature at autohorizon motor
- check: Has autohorizon gear smaltsome?? play in every degree?**
- 55 Overtemperature at telescope motor
- check: End-sensors are working and correct adjusted?**
- 56 Overvoltage on -30V internal power supply
- check: Mains or generator o.k.?**
- 57 Overvoltage on +30V internal power supply
- check: Mains or generator o.k.?**
- 60 Undervoltage on -15V internal power supply
- check: short cuts somewhere?**
- check: mains or generator o.k.?**
- 61 Overvoltage on -15V internal power supply
- 62 Undervoltage on +15V internal power supply
- check: short cuts somewhere?**
- check: mains or generator o.k.?**
- 63 Overvoltage on +15V at internal power supply
- 64 Undervoltage on +5V a1 internal power supply
- check: short cuts somewhere?**
- check: mains or generator o.k.?**
- 65 Overvoltage on +5V
- 67 Emergency push-button pressed at electronic case

2.11. Speed box

2.11.1. Introduction

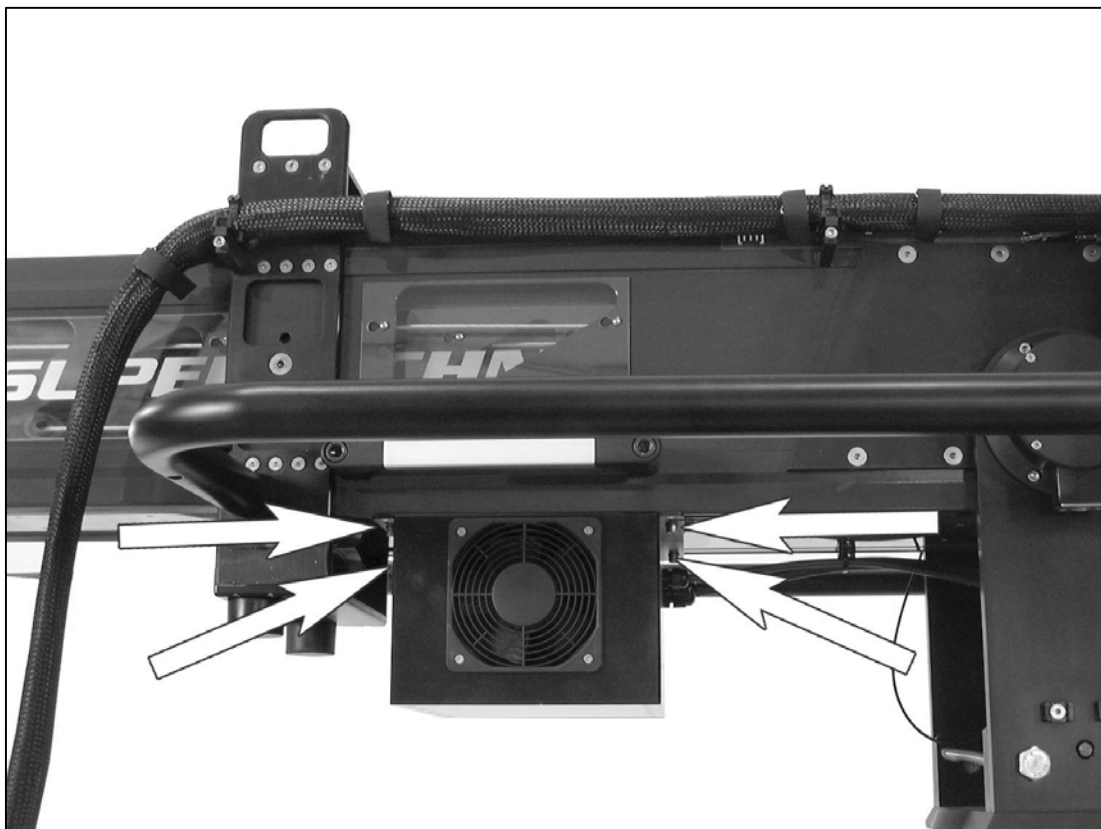
The speed box is assembled on the 1st beam section of a telescopic crane. Speed box speeds up the telescope movement 1,7 times.



2.11.1. Supertecho 22 with speed box

2.11.2. Assembly of the speed box

The speed box is mounted on the front part of the 1st beam section with 4 screws. By releasing all 4 screws the speed box can be easily removed.

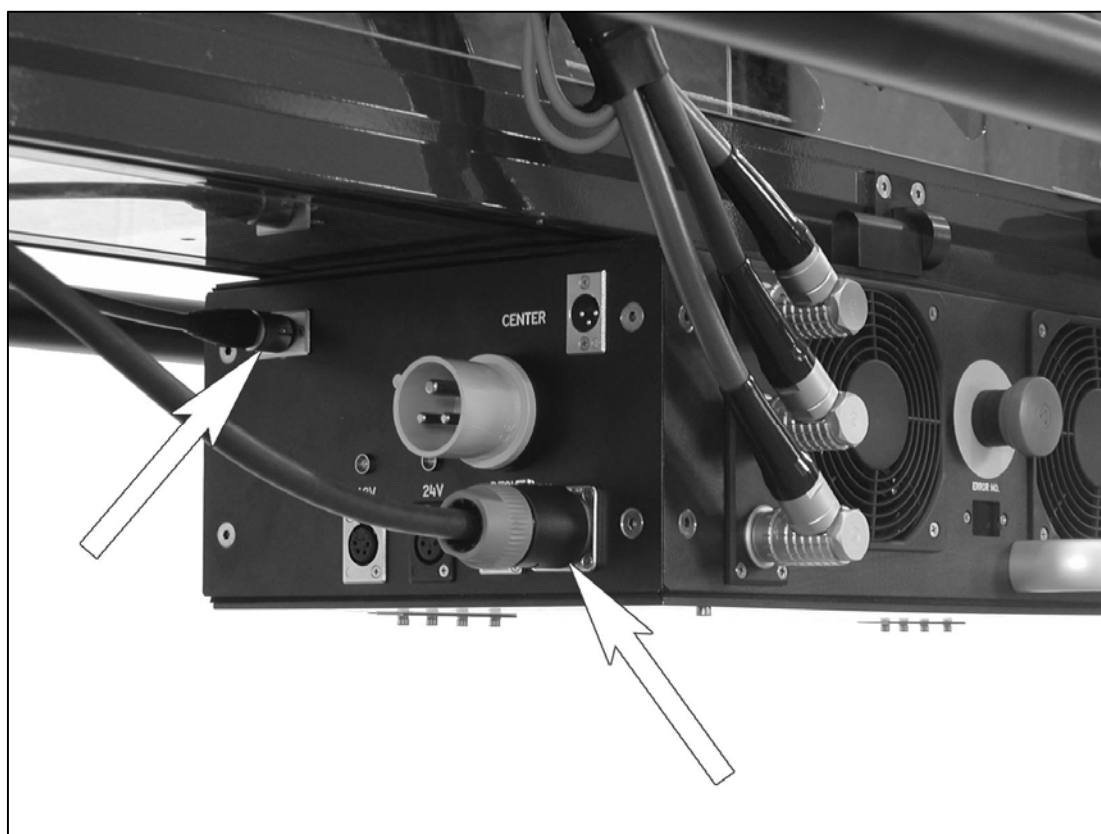


2.11.2. Screws on speed box

2.11.3. Connecting

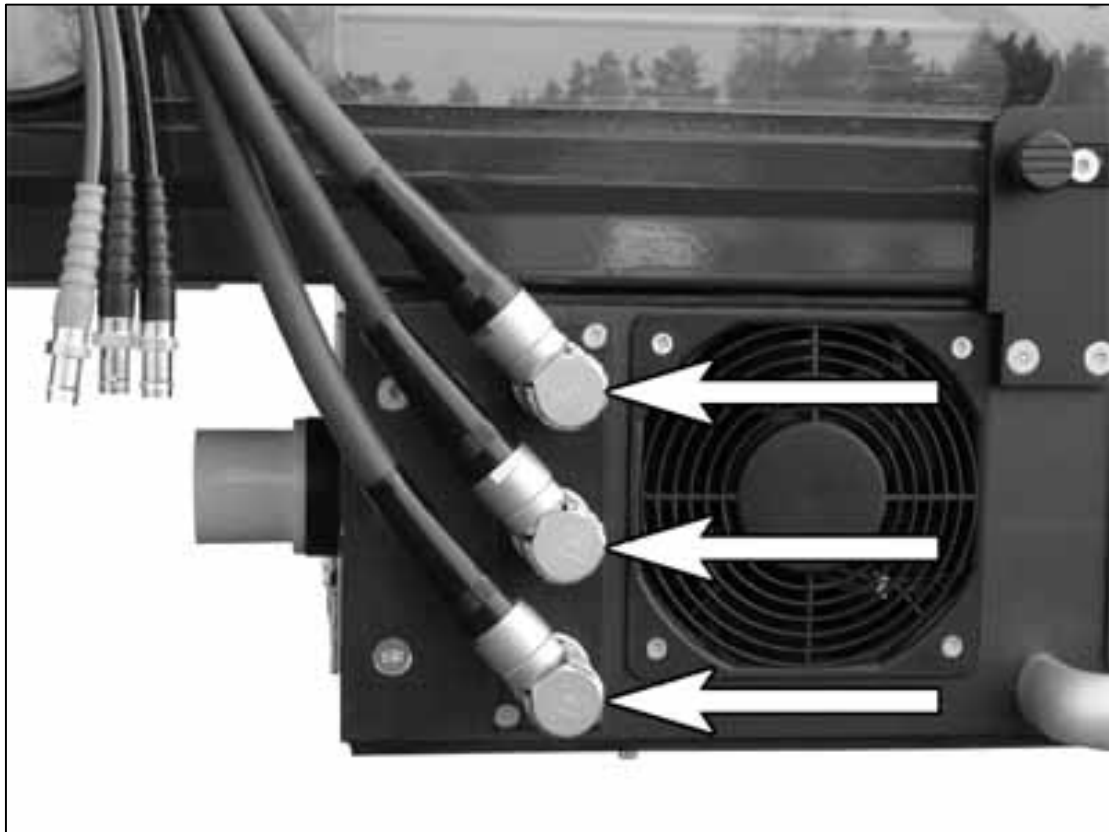
The speed box is connected by two cables to the electronics unit. If you want connect the speed box you have to:

- 1) Switch off the crane
- 2) Connect
 - 7 pole XLR connector
 - Speakon connector
- 3) Switch on the crane



2.11.3. Speed box connectors in the electronic unitscrew

If you don't have speed box connected, you must plug into the Speakon connector (in the electronics unit) the device adapter.



2.11.4. Device adapter

2.12. Telescope hand control

2.12.1. Operating

The telescope hand control is connected by cable to the electronics unit. If the crane operator works from the rear end of the crane he should use the short cable. If he has to work at the camera-head, he should use the long cable. The two cables can also be plugged together for extra length.

The crane operator controls the telescoping speed of the camera by means of the rocker switch on the telescope hand control.



2.12.1.a – Telescope hand control unit

Using the potentiometer on the rear of the hand control, the crane operator can pre-select the speed range on the hand control.



2.12.1.b – Turning potentiometer

Using the fluid potentiometer, which is integrated in the electronics unit, the operator can set the maximum acceleration and delay.



2.12.1.c - Turning fluid potentiometer at electronic unit

The crane can be switched off from the telescope hand control using the emergency cut off.



2.12.1.d - Red button at hand control

2.14 Desk

2.14.1. Assembly

For transportation the desk must always be folded up and the hand-wheels must be removed to prevent any damage to vulnerable controls.



2.14.1.a – Desk, folded



2.14.1.b – Do not open wheel breaks by hand



2.14.1.c - Open wheel breaks by foot

To assemble the desk, release all four locking levers. Then swing up the desk and, using the locking levers, fix it in an ergonomically favorable position.



2.14.1.d - Desk

2.14.2. Connecting

Before the desk becomes operational the following cables must be plugged in:

- a. Mains power cable (220 V plug)
- b. BNC connecting cable to the crane.
- c. Foot pedal cable (XLR 5 pole plug)
- d. Optional: cue (tally) signal (XLR 3 pole plug)

2.14.3. Switching on

Do not touch the controls during the first four seconds after switching on the power, because the desk is still adjusting itself. Wait until the red “wait” LED goes off).

2.14.4. Hand-wheels

The remote head can be controlled either with the hand-wheels or with a joystick. Choose your option by using the selector switch on the potentiometer panel. To avoid damage to the hand-wheel axles the hand-wheels must be removed for transportation.



2.14.4 – Desk with hand-wheels.

2.14.5. Joystick

The joystick responds only when pressed and is operated with the fingertips.



2.14.5.a – Pan-tilt joystick

Alternatively the desk can be fitted with a simprop joystick.



2.14.5.b – Simprop joystick

2.14.6. Focus and zoom

Focus and zoom are controlled by the left hand of the remote head operator.



2.14.6.a – Focus and zoom

2.14.7. Roll

Roll can be controlled in three different ways.

Either with the index finger:



2.14.7.a – Focus, zoom and roll

Or with the foot pedal:



2.14.7.b - Pedal

Or with the finger rocker:



2.14.7.c – Roll rocker

Roll can be controlled in two different modes:

Horizon “on”: the roll axis keeps moving as long as the joystick is pressed; once the joystick is released, the roll axis automatically returns. The maximum angle of the roll range can be pre-set using the “ratio” potentiometer. This mode ensures that the cameraman can easily return to the normal horizon.

Horizon “off”: the roll axis keeps moving as long as the joystick is pushed and a stop at the point the joystick is released.



2.14.7.d – Horizon switch

An additional feature, “banking”, can be activated. This switch turns off all the “roll” controls and the pan axis of the joystick also guides the roll axis. Similar to an aircraft when making a horizontal turn, the remote head tilts simultaneously sideways in the direction that it is panning, and returns to a level horizon when the head has stopped panning.



2.14.7.e – Banking switch

2.14.8. Potentiometer panel

All functions can be reversed by using the “rev.” switches. The “speed” potentiometer is used to pre-select the speed range. The “fluid” potentiometer is used to regulate the maximum acceleration or delay. The “camera on/off” button is for starting all cameras, if they permit this feature and are attached to the remote head. With the emergency cut-off button the whole crane can be shut down from the desk.

2.16. Pan bars

2.16.1. Transportation

For transportation it is important to make sure that the controls are protected. We recommend that the pan arms are removed and safely stored for transportation.

2.16.2. Assembly

The legs are placed in the preferred position and adjusted with their leveling screws until the base is level and stable.



2.16.2.a - Setting with M16 bolts

The telescopic column is then adjusted to the height preferred by the camera operator.



2.16.2.b - Locking of telescopic column

The pan bars can also be put on another stand or on a dolly equipped with a Mitchell adapter.



2.16.2.c - Mitchell plate at column

If the camera operator wishes to control the remote head with just two axes, the roll axis of the pan bars can be set in a fixed position with a screw.



2.16.2.d - Locking the roll

Two 9" monitors can be installed on the platform of the pan bars. Important: The monitors must be secured with a ratchet strap.



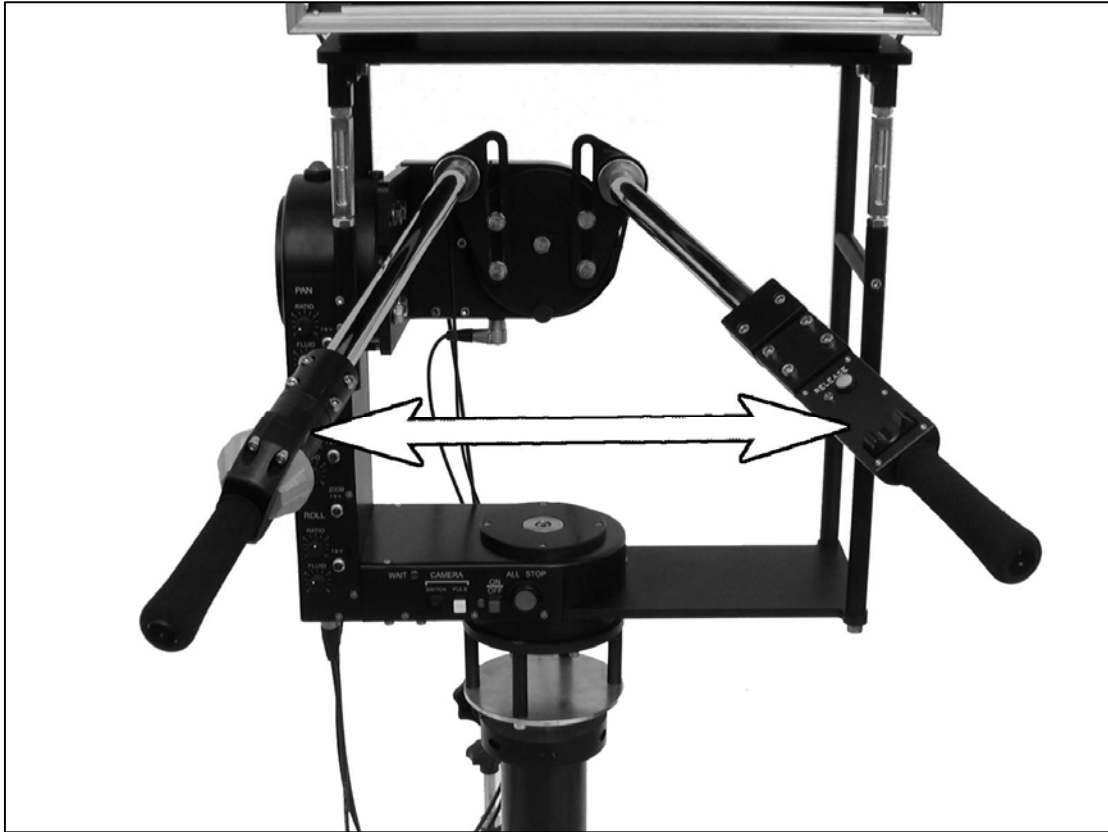
2.16.2.e - Two monitors on pan bars with straps

The angle of the monitor platform can be set with two movable studs.



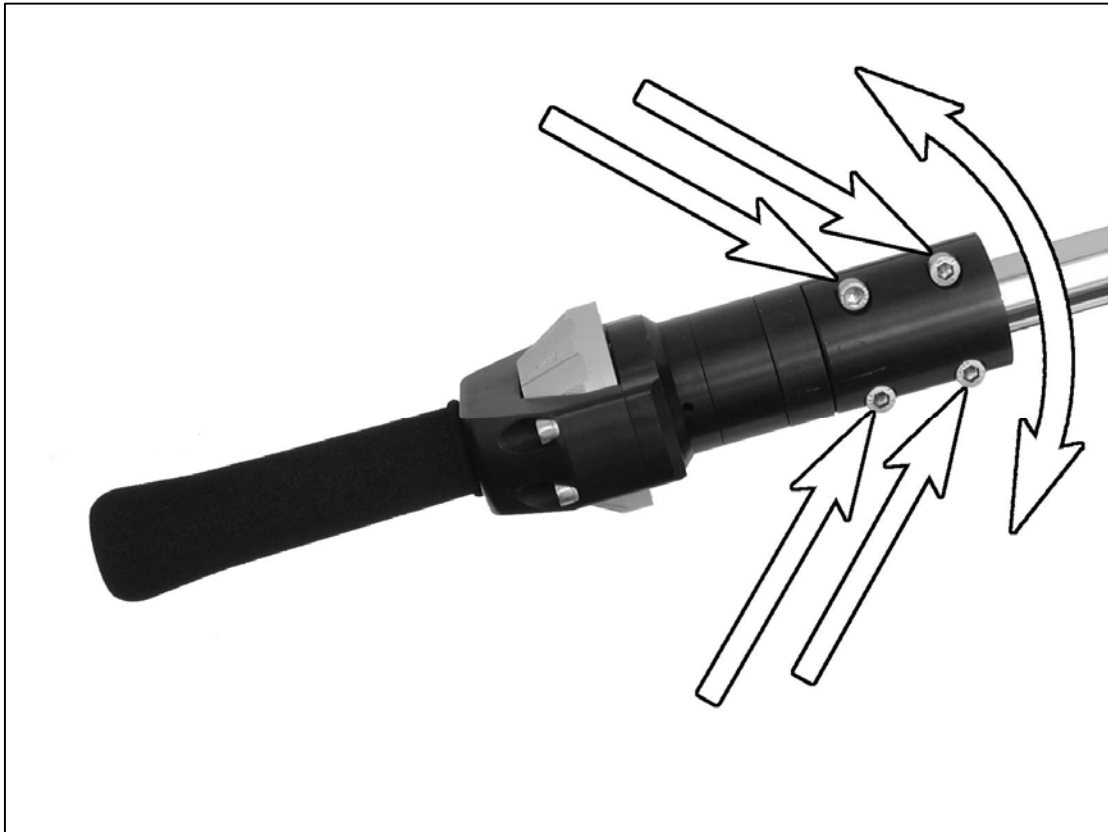
2.16.2.f - Setting the monitor angle with studs

The two arms can be swapped so that focus/zoom is controlled from the left or right side.

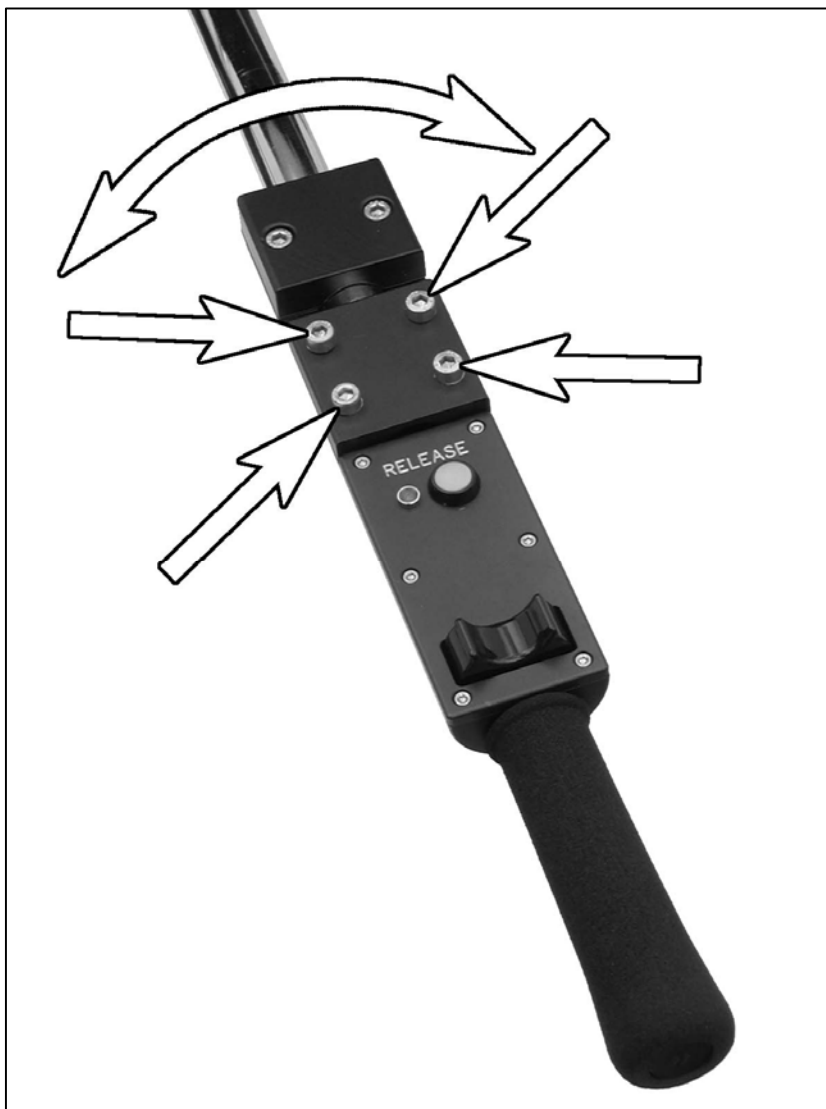


2.16.2.g – Swapping arms

The camera operator can also place the zoom and focus controls in the most favorable ergonomic position. To do this he unscrews the four locking screws and turns the controls to the desired position.



2.16.2.h – Focus unit with four screws



2.16.2.i - Zoom unit with four screws

2.16.3. Connecting leads

The power supply to the pan bars is via the mains plug. The control signals are transferred via a video cable with BNC plugs. A lead from the CUE input socket controls the tally light on the crane and on the pan bars.

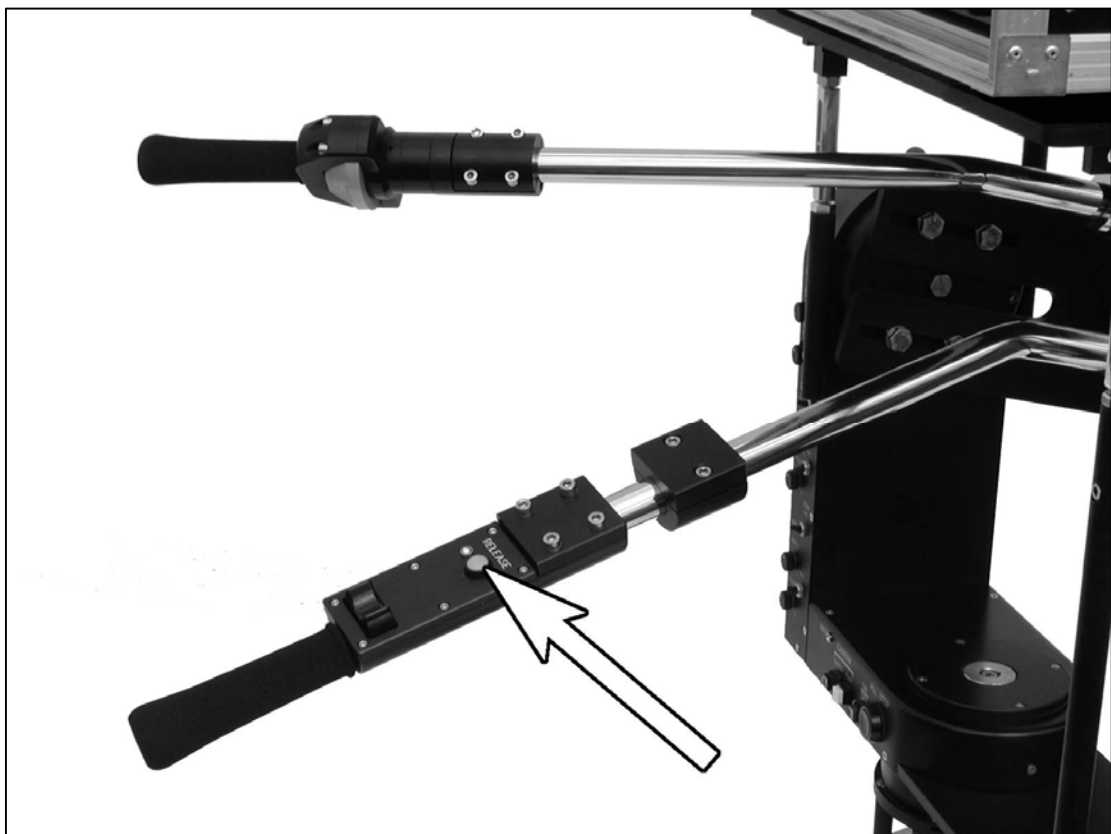
An accessory cable can also be attached for using “Preston” or “Scorpio” lens control systems. With this feature the camera operator controls the “Preston” or “Scorpio” lens motors with the focus roll and zoom rocker integrated in the arm of the pan bars.



2.16.3. - Connector sockets at pan bars

2.16.4. Operation

After it has been switched on, the camera is moved with the pan bars into the starting position. By pressing the RESET button above the zoom rocker, the remote head and pan bars are uncoupled. The pan bars are then moved to the desired working position and the camera and pan bars can be re-activated using the RESET button.



2.16.4.a. - RESET button at zoom

The ratio between the movement of the pan bars and the remote head is set by means of the RATIO potentiometers.

The maximum acceleration and delay of the remote head is set by means of the FLUID potentiometers.

The camera on/off switch is used to start and stop all film cameras.

The emergency cut off switch deactivates all functions of the crane and remote head.



