

*Servicevision Bis S.L.*

# *Scorpio Mini V*

*User's manual v1.05*





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## 1 TECHNICAL INFORMATION

### 1.1 BASIC INFORMATION

The Mini Scorpio Stabilized V Head sets a new level in the world of small, stabilized heads. Following some principles of the Scorpio Stabilized V, the design of this head allows it to be small, light, and strong enough to move professional camera packages where the creativity needs to.

The versatility that this head offers is unmatched. The Mini V can be mounted in any position (*not just under or over slung*), and the high payload it can handle makes it the best choice for any production. The development of new gyros has opened the door to infinite possibilities to mount this head with great performance on the stabilization and offering the possibility to always maintain the earth horizon on the movement.

The different mounts provided with the kit, eases the performance of the head for each specific situation. From those rough off-road shots to the finest dolly movements this head offers to the cinematographers the best control for their movements.

The thumbs up to shoot takes just a few minutes, there is no need to tear the camera body apart to attach it to the head. The design of the camera cage has been thought to make the balance of the remote head quick, and the adjustment of the stabilization parameters is like plug and play.

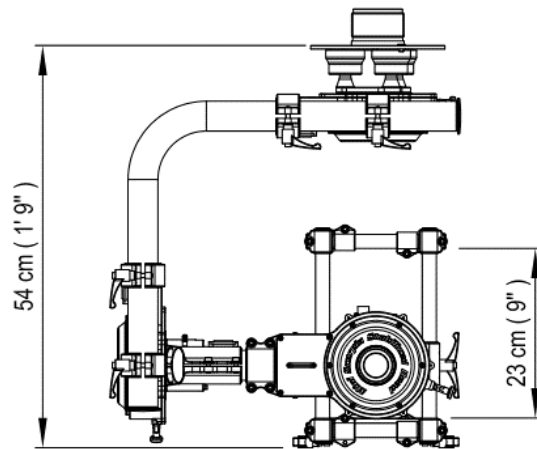
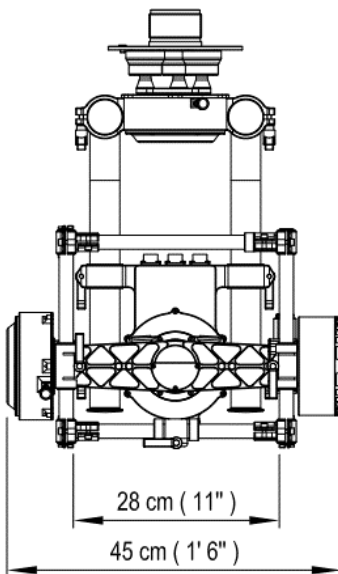
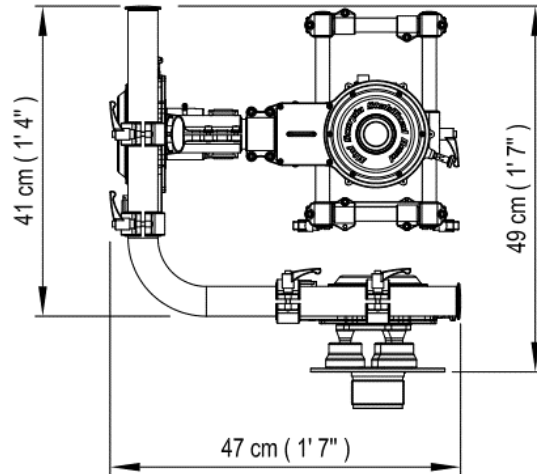
The roll ring accessory adds one more dimension to the camera movement. It allows the camera to perform a nodal 360° roll in any position of the head, opening the possibility to get amazing shots in any circumstance.

A Wi-Fi module has been incorporated to the head to allow the technicians to adjust the head on the go with a mobile phone, without interfering on the operators' job and ease the production.

The Mini V is fully compatible with any existing Servicevision' s remote control with a touchscreen: *Handwheels, Joysticks, Pan bars...* and it has kept the same features than the rest of our stab heads (*such as limits, lens control, axis assignment...*) and has incorporated new features from the regular heads like the possibility to record memories on the stabilized mode or to set stopping limits to be used in the middle of the shot.

## 1.2 TECHNICAL INFORMATION

<b>Max. Payload:</b>	20kg (45lbs.)
<b>Weight of the Head:</b>	20kg (45lbs.)
<b>Max. height (from the mount):</b>	540mm (1.9in)
<b>Max width:</b>	450mm(1.6in)
<b>Max. Speed:</b>	2 sec per turn.
<b>Rotation for Pan, Tilt &amp; Roll:</b>	360° for Pan (unlimited turns) 360° for Tilt (limited to 1,5 turns) +/-60° for Roll
<b>Power output for camera:</b>	12V 400W 24V 400W
<b>Controlled by:</b>	Cable up to 500m (1500ft) Scorpio Radio
<b>Power requirements:</b>	20V-36V Voltage range 1A still consumption 20A required (including camera power) 40 A for max speed, max payload



## 2 PARTS & COMPONENTS

### 2.1 GENERAL DESCRIPTION

In this chapter there is a general view of the main parts of the head and a brief description of each of them.



02.01 Mini Stab head general view

The mini stab V is a three axis stabilized head.

The pan module is the closer to the support attachment. It has a direct drive motor and the driver PCB board inside of it.

The roll module is on the rear part of the head. It has a direct drive motor and the amplifier driver inside of it.

There are two tilt modules attached to the roll. In the one with the heat diffuser (*Master tilt*) there are the voltage regulators and the main PCB of the head. On the holed tilt axis (*Slave tilt*), there is a direct drive motor and the amplifier driver inside of it.

### 2.2 PAN MODULE

The pan module has two parts: the fix part, which has the Mitchell mount with the keyway, and the movable part where the motor, the driver, the connectors, and the clamps for the carbon fiber bars are located.



02.02 Locking pin on the pan axis

The Mitchell mount is the attachment to the support. It is possible to attach different kind of suspensions in between the support and the head depending on the situations where the head is going to perform.

The cables arriving to the head can be passed through the hole in the middle of the axis to have clearance on the pan axis movements.

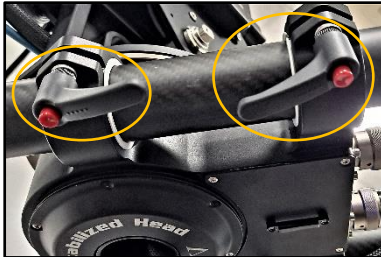
There is a locking pin to lock the movement of the axis in order to mount the camera package into the head or manipulate the head and prevent the axis to move. To lock it or loosen it, pull it back and

twist it 90° from the original position. The axis may need to be slightly moved as a way to find the locking point.



02.03 Connectors from Pan axis

There are two connectors in the movable part of the pan axis (fig.02.03): *VDC IN 24/30V HEAD COMMAND*, where the head receives power and communication. *OUT 1* connector sends power and communication lines to the roll module. To connect the cables in these connectors, align between male and female and twist the cable to lock them in place. An adjustable plier can be used to ensure they are locked.



02.04 Knobs in pan axis

The button in between both connectors is the standby button. It disengages any communication between the Head and the control when is pressed. Also, it lights blue when pressed to indicate that the standby mode is enabled. Any modification in the camera package requires this button to be pressed in order to disengage the motors of the head.

The bracers for the carbon fiber bars are hold with the knobs. To slide the bars along the axis, release the knobs of both sides by unscrewing them and ensure that both bars are at the same distance from the end. If these bars are not equal, the balance of the head will be misled.

## 2.3 ROLL MODULE



02.05 Knobs in the roll axis

The roll module is on the rear part of the head. It is attached to the carbon fiber bars coming from the pan axis with four bracers (fig.02.05). These bracers have knobs used to adjust the height of the roll depending on the size of the camera package. To release the knobs, unscrew them and ensure that both bars are at the same distance from the end. If these bars are not equal, the balance of the head will be misled.



02.06 Connectors on the roll axis

On the outer side of the roll than the knobs, there are three connectors: *OUT 3* and *OUT 2*, that connect the roll module with the tilt modules and *IN 1* which connects with the pan module. Both connectors for the tilts have the same pinout (*it does not matter which one goes to each tilt axis*). To connect the cables in these connectors, align between male and female and twist the cable to lock them in place. An adjustable plier can be used to ensure they are locked.

Inside this side of the roll axis there is the motor and the amplifier driver to control this motor.



02.07 Locking pin from the roll axis

There is a locking pin to lock the movement of the axis in order to mount the camera package into the head or manipulate the head and prevent the axis to move. To lock it or loosen it, pull it back and twist it 90° from the original position. The axis may need to be slightly moved in order to find the locking point.



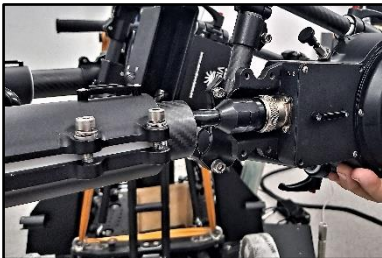
02.08 Bracers on side bars w/ screws marked

The inner part of the roll is where the tilts are supported. There is an aluminum “U” shaped part with carbon fiber bars attached at the ends of the “U”. These bars can be loosened up and pulled in or out to adjust the size of the head to the camera package using the *DIN912 M6x25mm* screws shown in the *fig. 02.08*. There is one knob holding the cover for the cable, to adjust the size of these bars it is necessary to open the cover by removing the knob and adjusting the size of the cable to prevent it to break.

The *OUT 2* and the *OUT 3* cables run along the movable part of the ROLL and they are protected with a cover on the camera side. They also run inside the carbon fiber bars and they are connected to each tilt axis under the tilt bracers. Before starting the head, verify the twist of these cables on the roll axis and if necessary, undo the turns on the roll axis.

## 2.4 TILT MODULES

There are two tilt modules connected to the roll. One cable runs inside each carbon fiber bar and is connected into the tilt module from the roll (*fig. 02.09*). Once the cable is connected the module can be attached mechanically by closing the clamp with four screws (*DIN912 M5x18mm*) that braces it into the carbon fiber bar.



02.09 Connector for tilt axis

These tilt modules need to be mounted in a specific position respect the roll, if they are mounted backwards the head may spin without control when it communicates with the control. This position is as shown in the *fig. 02.10*: The Roll axis with the cable holders on top and then the tilt axis with the Servicevision cover (*Master tilt*) on the right side looking at it from the front and the *Slave tilt* on the left.



02.10 Frontal view of the tilt axes

**Warning: If the tilt modules are not properly assembled, the head may spin without control when it communicates with the control.**

The holed module is the slave tilt. It has a direct drive motor and the amplifier driver to control that motor. It also has a Lemo connector underneath to connect the *Roll Ring* accessory (*fig.02.11*). There is a small hole in the movable part of the slave tilt, this hole must be on the bottom side of the cage.

In the covered tilt axis (*Master Tilt*) there is the main servo board of the head and the Wi-Fi transmission board. Notice that the master tilt is the one with the heat diffuser on the outside. On the inner side of the master tilt on the top side there are three connectors, an antenna, and an LED (*fig.02.12*). The 5-pin Lemo connector provides power and communication to the Scorpio focus system.



02.11 Roll Ring connector on slave tilt



02.12 Connectors on master tilt axis

The 4-pin panel *SOURIAU* connector powers different cameras with the proper cable. The 4-pin Lemo is a data output connector to collect data from the head.



02.13 Lock for tilt axis

There is a locking pin to lock the movement of the axis in order to mount the camera package into the head or manipulate the head and prevent the axis to move. To lock it or loosen it, pull it back and twist it 90° from the original position. The axis may need to be slightly moved in order to find the locking point.

The LED from the master tilt gives information regarding the status of the head as the following table describes:

LED Indicator	Status of the Head
OFF	Digital board without power.
FLASH ORANGE	The Digital board is initializing the axes, it might flash up to 15 times
FIXED RED	Without communication with the CCU ( <i>control desk</i> ).
FIXED GREEN	Motors engaged; head ready to use.
FLASH RED/GREEN	Standby mode enabled from the CCU ( <i>control desk</i> ).

On the movable part of the tilts there are knobs to lock the cage in the desired position. There is also a cable that connects the camera platform with the master tilt side. The protected cable connects the main servo board to the camera platform. Through this cable runs the information of the sensors attached under the camera platform.

## 2.5 THE CAGE

The smart construction of the cage allows to mount the camera with standard camera accessories or attach different brackets to the bars (*the section of the bars is 19mm*).



02.14 Part to be removed to insert the cage

The cage needs to have one side open in order to assemble it into the tilts (*fig.02.14*). Move both tilt axes to the same mechanical limit to ensure that both are on the same position and then slide the bars into the tilts in order to attach it into the head. Lock the knobs to secure the cage and reattach the removed top part of the cage by screwing the side screws (*DIN 912 M6x18mm*) for the corner brackets.

**Note:** Notice that the position of the cage is with the camera platform on the opposite side of the LED and the connectors from the master tilt.



02.15 Top part of the cage







A – Bridge for camera holder bar


B – Bracket for horizontal bars cage

There are two bars attached in the upper part of the cage. One of these bars is to give rigidity to the cage and needs to be as close to the connectors side as possible (*B on fig. 02.15*). The other is used to attach the camera package to the head. The position of this bar will be readjusted depending on the camera package. On the bottom part of the cage there is the camera platform with a PCB board inside connected to the master tilt side. This platform and the top support bar (*A on fig. 02.15*) can slide sideways in order to balance the camera package.

## 2.6 PARTS & ACCESSORIES

The Scorpio Stabilized V Head is provided with different cables and accessories. In this chapter there will be a brief description of each accessory and cable provided with the head.

Component	Ref.	Qty.	Description
Camera power cables 	2015 2024 2029 2046		Camera power cable for ARRI Alexa, 435... Camera power cable for 12V Cameras Camera power cable for Red EPIC Camera power cable for Alexa MINI, Amira.
MSV Isolator 4 spring with Mitchell mount and nut. 	3606		Suspension designed to use the head in camera cars, Scorpio Arm or similar.
MSV Power unit 40A 	7472		The P.U. is a 30v 40Amp power supply. It has a 15Amp fuse in the back part. It is powered from AC current and has four 3pin XLR outputs to power the remote head and the crane.
Set of fuses 	7475		15A FUSE for power unit 40A.
Set of tools 	9353 2482 0077 7431 0111 0854	1 1 1 1 1 1	Adjustable plier Allen key set 5mm "T" Allen key Mitchell mount tool Camera platform screwdriver Bubble level
Set of brackets 	3620 3621 3622 3623 3624 5301 5310 5302 5315 5308 5311 3625 3518 3627 3626	1 1 6 3 4 2 2 2 3 9 9 2 4 1 1	MSV Camera slider holder bar MSV Camera holder extension for video cameras MSV 15mm bar with 3/8' screw (34mm) MSV 19mm bar with 3/8' screw (34mm) MSV 19mm bracket with 3/8' screw (female) Long bracket (Arri, Panavision, Moviecam...) Middle bracket (Arri, Panavision, Moviecam...) Short bracket (Arri, Panavision, Moviecam...) Right angle bracket Arri bushing 15mm to 19mm (Blue) Panavision bushing 0.635" to 19mm (Gold) MSV Long bar (320x19mm) with 3/8' screw MSV/SSV 15mm rods (70mm) MSV 40mm Bar alignment bracket MSV 40mm Bracket for radio module on head

Spare hardware			
	3629	2	MSV Quick release knob 25mm
	3628	2	MSV Quick release knob 20mm
	3635	2	MSV DIN 912 6x25mm Screws for toll bracers
	3634	4	MSV DIN 912 5X16mm Screws for tilt bracers
	0228	4	MSV DIN 912 6x14mm Screw for corner bracket
	3619	2	MSV Screw ( <i>short</i> ) for camera support/ camera holder bar
	3630	2	MSV Screw ( <i>long</i> ) for camera bridge

## 2.7 HEAD CONTROLS

All the touch panel controls from Servicevision are compatible with the Scorpio Mini Stab V. They need to be upgraded to the white screen display with a software newer than 5.91H.



02.16 Handwheels control



02.17 Pan Bar control (JDR)



02.18 Joystick control

Every control moves the head in different ways but there are some similarities and common points:



02.19 frontal display

In the frontal part of each control there is the display. This is a touchscreen panel to interact with the system (see [chapter 4: Control display](#) for more information). There are also different potentiometers under the screen. These potentiometers (or knobs) adjust the speed of every independent axis of the head. The range goes from 1% to 100%

On the right side of every potentiometer there is a REVERSE button. This reverse button has two functions: if it is pressed once, it will disable the axis (it will display 0 speed on the screen). If it is pressed a second time, it will reverse the direction of movement of that axis.



02.20 Rear panel from HW

On the back of the controls there are different connectors depending on the kind of control being used. The common connectors are:

>**Vdc 24/30V (3pin Male XLR)**: this is the power input. VDC from 24V/30V.

>**12V/3A OUT (4pin Female XLR)**: this connector gives an output of 12V/3A to power a small monitor for the cameraman.

>**HEAD COMMAND (6pin Female XLR)**: from this connector the remote head communicates with the control. In case there is a Radio Link between the head and the control it also provides power to the Radio module.

>**FIZ COMMAND (7pin female LEMO)**: this connector has a power output and a communication line for different uses. It can be used to communicate the *Scorpio Focus* or to communicate the control with the *Scorpio Cranes*.

>**JDR ZOOM / JDR ROLL / PEDAL / ROLL HANDWHEEL....**: These connectors are for different peripherals for the system. To control different axes (Roll, Zoom, Iris, Focus...) from different kind of controls. There is more information about the assignment of these peripherals in the [chapter 4.7.2 Command assignment](#).

In all the controls there is a switch to turn the control ON/OFF.

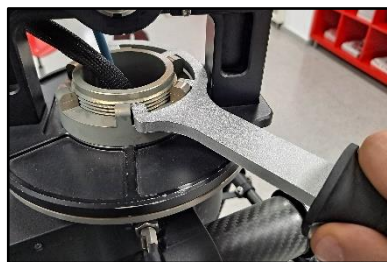
## 3 SET UP THE EQUIPMENT

### 3.1 SET UP THE REMOTE HEAD



03.01 Position to remove from the box

The Mini Scorpio Stabilized Head V is stored inside the box with all the knobs loose. To take it out of the box, pull gently from the pan axis and lock the roll axis and the tilt axis once the pan is vertical respect the tilt to prevent any movement and make it easier to manipulate (fig.03.01).



03.02 Lock the Mitchell mount

To mount the head, screw the Mitchell mount into the support with the Keyway aligned then tight firmly the nut using the castle tool provided with the head to lock it in place as seen in fig.03.02.

The isolator suspension will be mounted between the head and the support using the same Mitchell mount system. It has been designed to be used on those situations where high frequency vibrations arrive to the head and it is needed to soften those vibrations (*normally in a Camera car or similar situations*).



03.03 Bottom view of the base plate

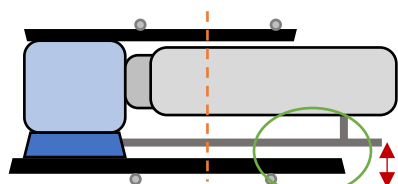
Once the head is mounted, block all the axes using the blocking pins on each axis and mount the base plate for the camera in the cage using the two screws through the sliding base of the cage. It is recommended to attach the sliding screw as front as possible since the attachment base to the head will be wider.

Also, it is recommended to leave the base plate in a certain position depending on the camera package that will be used: for heavy cameras and light lenses move the sliding plate to the front before tightening, for light cameras and heavy lenses leave more room to slide it on the back part of the cage.

Loose or remove if needed the top part of the cage (fig. 02.14) in order to have enough room to fit the camera comfortably inside the cage.

### 3.2 FASTEN THE CAMERA PACKAGE

To get a good performance with the Scorpio mini stab V it is mandatory to have the camera package perfectly attached to the head from top and bottom, for big camera packages also fasten the front and back. If the camera package is not properly secured, there might be some vibration problems that will not allow the head to perform at 100% stabilization.



03.04 Camera locked only from the rear, the front part of the lens vibrates at a different frequency than the rest of the head, it is necessary to lock the front part.

The fig. 03.04 is a lateral diagram showing a small camera with a big lens with the balance point marked with a discontinuous orange line. As it is shown, even if the camera is attached to the cage from top and bottom it is still necessary to fix the lens to the structure from the front because it is only supported from the left side of the balance point (*the lens and the camera rods are only supported on the rear part*). This might generate vibration in the pan or tilt axis. On the fig. 03.05 & 03.06 it is shown the difference and one solution to tight it properly.



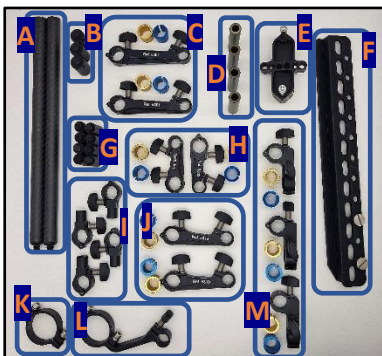
03.05 Camera not properly secured.



03.06 Camera locked in the front.

Different brackets are provided with the head to fix the camera package to the head, and it is under the technicians' judgment to use them as their convenience, but the purpose of the brackets is to secure the camera firmly to the head and force it to act as a compact block.

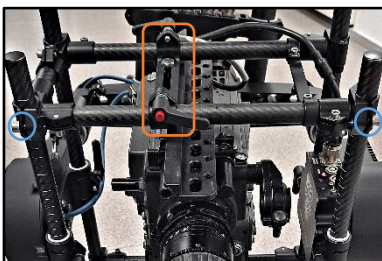
Below is shown the different brackets provided with the head to attach properly any possible camera configurations.



03.07 Different brackets provided with the head.

- A- 2 x 3625 MSV Long bar (320x19mm) with 3/8 screw
- B- 3 x 3623 MSV 19mm bar with 3/8 screw (34mm)
- C- 2 x 5301 Long bracket
- D- 4 x 3518 MSV/SSV 15mm bars (70mm)
- E- 3621 MSV Camera holder for video cameras
- F- 3620 MSV Camera holder bar (top)
- G- 3622 MSV 15mm bar with 3/8 screw (34mm)
- H- 2 x 5302 Short bracket
- I- 4 x 3624 MSV 19mm Bracket with female 3/8 screw
- J- 2 x 5310 Middle bracket
- K- MSV 40mm Bracket
- L- 3626 MSV 40mm Bracket to 15mm for Radio support
- M- 3 x 90° Bracket

To fix the camera package, slide the camera into the base plate and lock the quick release lock from the camera (*Do this operation with the tilt axis secured by the locking pin*). Proceed to attach the upper part of the cage to the camera package using the different brackets provided with the head.



03.08 Top bridge attached to the slider holder for the camera.

Depending on the camera package, the way to fix the top part to the cage will be different. For example, the *top camera slider holder bar* can be screwed into the camera handle using the camera platform screws or the *upper bridge for camera holder bar* can be attached directly to the handle.

Mount the top part of the cage and secure it first to the camera package (*orange area marked in fig.03.08*) using the clamp for the bridge to the camera bracket (*for example*) and then tight the corner screws on the top part of the cage (*blue screws marked in fig.03.08*).

Once the camera is fixed to the head, it is ready to be balanced.

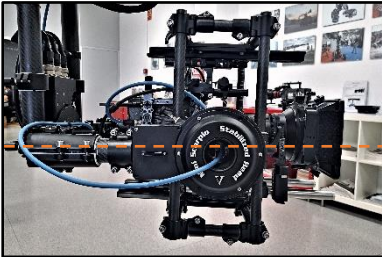


03.08b Support in the rear part.

Notice that some cameras (*like the Alexa Studio*) are just supported in one point in the center, and the rear part of the body is not supported anywhere. To prevent possible vibrations, it might be better to use the brackets as shown in *fig. 03.08b* in order to give rigidity to the camera package.

### 3.3 BALANCE THE CAMERA PACKAGE

Once the camera is attached to the head it needs to be balanced. To balance the camera package, it is mandatory to configure it trying to keep all the masses as close to the center of the axis as possible. The more compact and solid is the camera package, the better the system will perform.



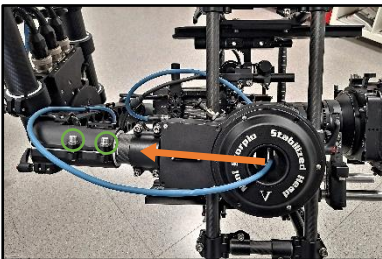
03.09 X axis marked with the line

Start to balance the tilt axis by unlocking only the tilt axis blocker and, with the camera pointing straight front (*from now on X axis*), slide the camera package front and back along the base plate until it does not fall front or back. Once it stays, lock the quick release of the camera and the upper camera slider holder bar to the camera package by tighten the camera screws from the top bridge.



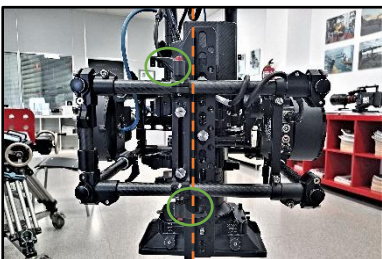
03.10 Y axis marked with the line

Once the X axis is balanced, point the camera package straight down (*or straight up*) to do the balance of the tilt in the Y axis (*fig.03.10*). In this position, we are checking the top/bottom weight relation. Loose the knobs holding the cage from the tilt axes and slide the cage top or bottom until it does not fall front or back. Once it stays, lock the knobs from the tilt axes.



03.11 Adjust of the head length.

At this point it is possible to adjust the length of the head by sliding the inner bars from the roll holding the tilt axes (*fig.03.11*). Loose the screws from the roll bracers (*green in fig.03.11*) and adjust the length of the head accordingly to the camera package. It may be necessary to remove the rear cover (*fig.02.08*) to slide the cables with the bars.



03.12 Z axis marked with the line.

With the tilt axis balanced, proceed to balance the roll axis (*Z axis*). With the tilt axis locked, loose the knobs holding the camera platform (*bottom part of the cage*), the knobs holding the top bridge (*marked in green in fig. 03.12*) and unlock the roll axis blocker to see which side of the Z axis is heavier. Slide the camera package sideways until it does not fall either side of the roll and lock the knobs again. Verify that in any possible position for both axis (*Tilt & Roll*) the camera remains in that position.

**Note: The balance of X, Y & Z axes must be done with the roll axis parallel to the earth (for nose mount, do this balance with the roll in one side of the head and not on top or bottom).**



03.13 Adjust the head height.

Now is possible to adjust the height of the head by approaching the roll axis to the pan along the carbon fiber bars by loosen the knobs holding the roll axis (*yellow in fig.03.13*). Adjust the size accordingly to the camera package.

The last balance is the balance on the pan axis, it is necessary to have the Mitchell mount slightly off level in order to see if the masses are centered to the Mitchel.



03.14 Balance on the pan axis

This will be easily seen in case the head is attached to the suspension. The Mitchell mount of the head will not be flat respect the one on the suspension.

Use the knobs on the pan axis (*yellow in fig.03.14*) to loosen the bars and move them to one side or the other in order to balance this axis until the pan axis stays in any position where it is leaved with the Mitchell mount off level.

## BALANCE IN NOSE MOUNT



03.15 Nose mount roll on one side.

When the head is nose mounted, it is recommended to balance the X, Y & Z axis with the roll in one side of the head and with the safety pin of the pan axis locking the head (*fig.03.15*). The procedure to balance those axes is the same as in the regular underslung or over slung mode: move the camera package accordingly to make the head hold any roll and tilt position.



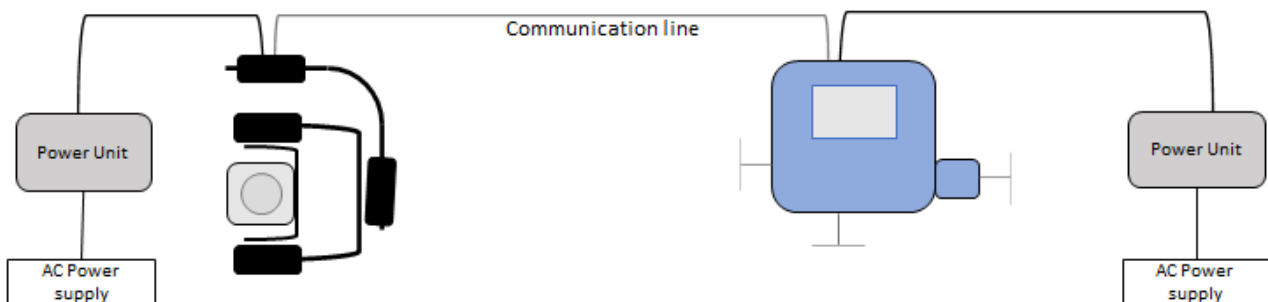
03.16 Nose mount, roll on the bottom.

Once the roll and the tilt are balanced and with the roll still in one side, remove the safety pin of the pan axis and verify the balance of the pan axis. To adjust this balance, move the roll to the top or the bottom of the head and loose the knobs of the pan axis, it will be easier to slide the bars in this position and then move the roll to the side again to verify that these bars are in the proper position.

**Note:** *In the event the head is nose mounted with the roll axis on top or bottom and it is not possible to balance it, it might be necessary to do an [Alignment of the carbon fiber bars](#).*

## 3.4 CONNECTING THE MINI STAB

To operate the Mini Scorpio Stabilized V, the head needs to be powered, it needs to communicate with the control and the control needs to be powered too.



To start the Mini Scorpio Stabilized V, it needs to be done through the Multicore connector on the head using the Cable adaptor from the MSV to a standard Scorpio head. To power the Mini Scorpio Stabilized V, connect both 3pin XLR from the SSV Cable adaptor to the power unit.

Regarding the power requirements it can be powered from 20V to 35,5V but it is necessary to consider the voltage drop on the line. Depending on the distance from the power source it will be necessary to connect one or both 3 pin XLR to increase the section of the power line and minimize the voltage drop of the line.



03.17 Cable adaptor for MSV

Extension cables from the cables box can be used if needed. Batteries instead of the power supply can be used to power the system as far as those batteries can achieve the technical specifications required for the equipment. As soon as the power supply is switched on, the rear switch from the power unit will light in orange and the LED in front of the power supply will light in green. The head will receive power and it will start initializing and the LED from the remote head will start flashing orange.

Once it finishes the calibration, the LED from the head will light in fixed red. That means that the head is ready to communicate with the control.

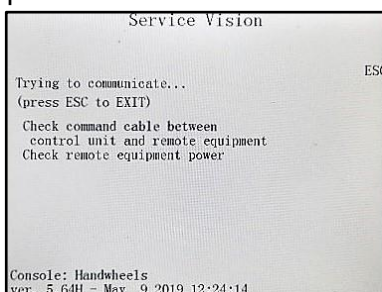
**Note: Check the voltage input to the head in the main screen of the control to verify that the head has the correct voltage input.**

### 3.5 COMMUNICATING WITH THE CONTROL

The 6 pin XLR from the multicore cable is the communication line. It needs to be connected to any of the Scorpio controls. To do that, extension cables from the cables box can be used as many times as needed up to 500m(1500ft). The Scorpio Radio can be used to communicate the head with the control wirelessly instead of using extension cables.

The Mini Scorpio Stabilized V Head can be used with different kind of Scorpio controls but all of them must be upgraded to the CCU2000 PCB boards (*white touchscreen display*) with a newer software than 5.91H.

Once everything is connected, it is possible to start the control by using the start switch on the back part of the controls.

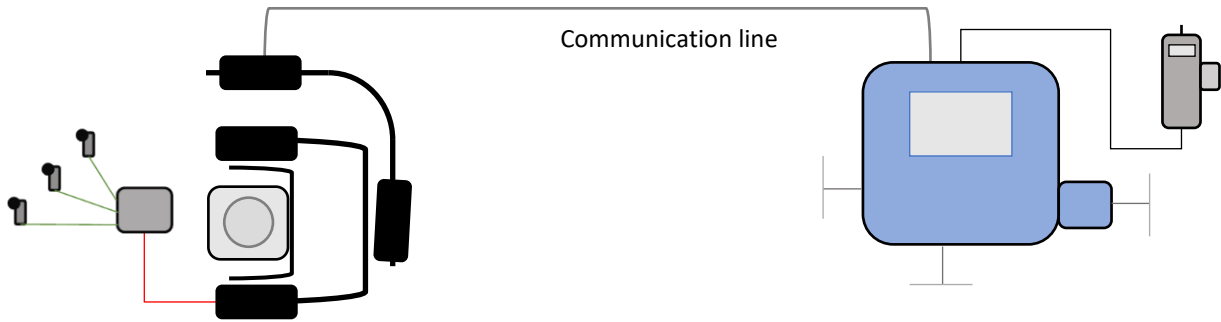


03.18 Trying to communicate

**Note: The control can be started while the head is in any position (for example the tilt axis can be 45° off and the system will identify in which position is the head).**

**Note 2: If the standby button on the head is pressed, it will not communicate with the control (fig. 03.18 will be shown)**

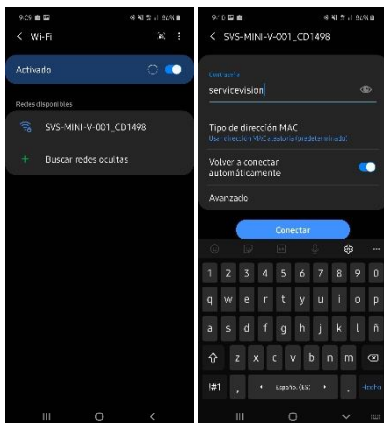
### 3.6 CONNECTING THE SCORPIO FOCUS SYSTEM BY WIRE



To connect a Scorpio Focus, the Motor Driver Box (M.D.B.) is connected with a red 5pin Lemo cable to the FIZ connector in the Head. That will provide power and communication to the MDB system.

The Remote Hand Unit will be connected on the control through the white 7pin Lemo cable. That will provide power and communication to the H.U. from the control and will link both (M.D.B & H.U.) to the same communication line. The Scorpio Focus must be connected before starting the control, other ways the system will not identify it.

### 3.7 CONNECTING TO THE SCORPIO APP



03.19 Screenshots from Wi-Fi and pwd.



03.20 Screenshot from the Scorpio App

The Scorpio App allows to modify parameters of the head or to activate different functions like the limits using a mobile phone. To connect to the head, download the App from the Google marketplace and connect the phone to the Wi-Fi module of the head.

**Note: The password of all the Wi-Fi modules is "servicevision" all together in lowercase letters.**

It is necessary to allow the app to accede to the location in order to let the app know the Wi-Fi hotspot name where it is connected. If the location is not enabled, it will not be displayed the name of the Wi-Fi module in the upper part of the screen.

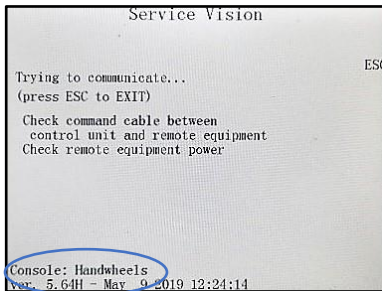
Once the link to the Wi-Fi has been done, it is possible to communicate with the head by pressing the Start button in the main of the screen.

To know how to use the App and the parameters that can be modified, please refer to the [Scorpio App USER MANUAL](#).

**Note: It is necessary to enable the communicate by Wi-Fi from the control. In the [chapter 4.6.16](#) it is explained how to enable the Wi-Fi communication.**

## 4 CONTROL DISPLAY INFORMATION

The following chapter describes the different screens from the controls when you connect them to a Scorpio Mini Stab V.

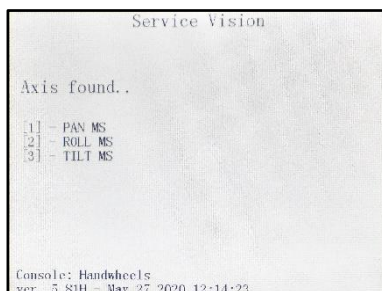


04.01 Trying to communicate screen.

When the system is started, it tries to communicate with anything connected to the communication line.

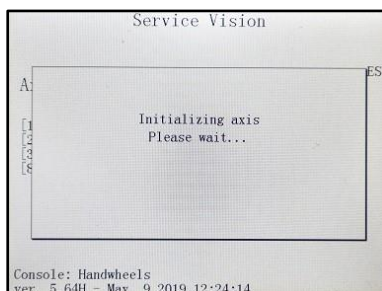
If it cannot find anything, the screen *fig.04.01* will be displayed.

The kind of control and the software version of the Control is displayed in this screen (*bottom left corner*). The version to connect to the Scorpio mini-Stab V must be higher than 5.91H.



04.02 Axis found

Once it connects with the head, the first thing the system does is identify everything connected to the communication bus (*fig.04.02*). the axes to be identified are: PAN MS, TILT MS and ROLL MS. More axes can be connected (*Scorpio Focus, Dolly...*) and all of them will be identified only at this moment.

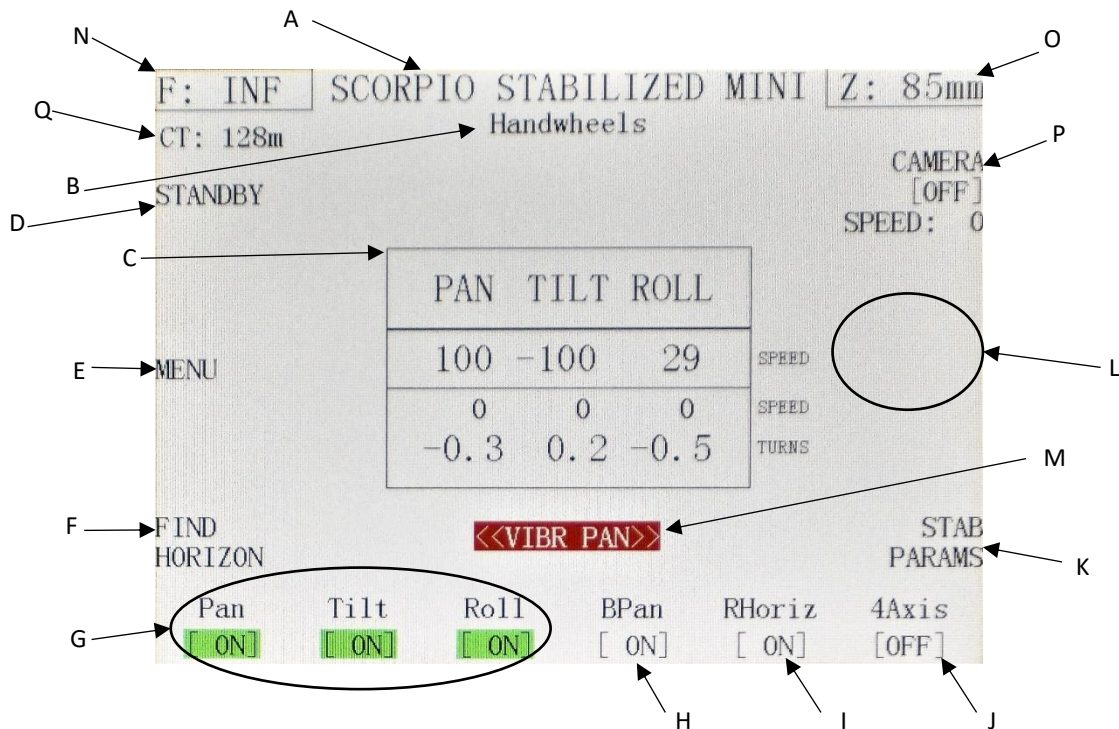


04.03 Initializing axis

Once this identification has been done, the system starts initializing the axis (*fig.04.03*). This may last up to 15 sec.

When the axes are initialized the head engages the motors and the main screen is displayed.

## 4.1 MAIN SCREEN



04.04 Main Screen Display

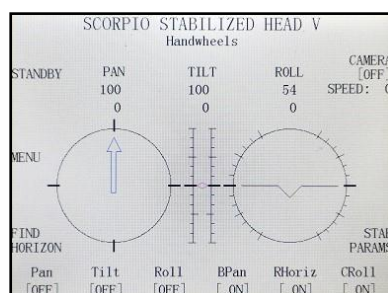
PAN	TILT	ROLL
14	100	54
0	1	0
-77	-21	-1

04.05 Axis names & information

A – Max speed of each axis

B – Actual speed of each axis

C – Degrees of position



04.06 Alternative display for axis info.

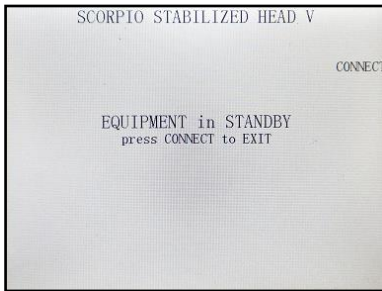
**A) Model of Head:** The display shows the type of Head detected.

**B) Control type:** Name of the control (*Handwheels, Joystick, Pan bar...*). If the head has voltage sensor, it will be displayed under it.

**C) Axis Information:** Displays all the axis that can be controlled by the user. For each axis there is a Max. speed (adjusted with the potentiometers), the actual speed of the axis while moving (*from 0 to 100*), and the position of each axis (*fig.04.05*). The position can be displayed in degrees or number of turns by pressing on the blue marked zone from *fig.04.05*. There is an alternative display than shows the same information but graphically (*fig.04.06*). To see it, press and hold the axis name zone from *fig.04.05* for 5 sec. To come back to the numbers display, press the middle of the touchscreen for 5 sec.

**D) Stand by button:** When pressed, it sets the head into standby mode (*fig.04.07*). The standby mode decreases the current consumption from the head. In this mode the head cannot be

controlled by the control desk, and it disengages the motors of the head.

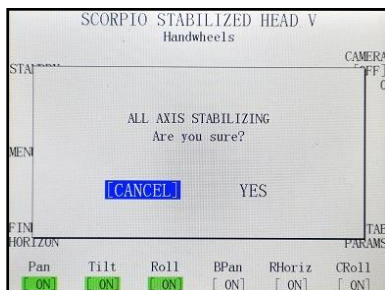


04.07 Standby screen

**Note:** If it is needed to manipulate the camera package, remember to press the standby button from the head just in case someone reengage the head from the control while manipulating the head.

**E) Menu:** Opens a dropdown tab with different functions and configurations for the head (see [chapter 4.2](#)).

**F) Find Horizon:** If this button is pressed, the head moves automatically to the horizon. If the button is hold for 2 seconds, the head moves smoothly to the horizon. The speed can be adjusted in the [Roll settings menu](#) from the *Settings* tab. It will only find the real horizon if the stabilization of Pan, Tilt, and Roll is activated. If the three axes are not activated, it will find the middle point of the roll axis.



04.08 Disconnecting Stab

**G) Pan/Tilt/Roll:** When pressed, the stabilization for each axis is activated. If all the stabilizations are engaged and any of the axis buttons is pressed, the system will ask for confirmation of the user to disengage the stabilization to prevent accidental disengagements (*fig.04.08*).

**H) BPan:** Activates or disengage the back pan of the head. If the Back-Pan feature is activated, the Head holds the same pan position respect the earth while the support of the head turns. When the Back-Pan is off, the Head will hold the same position on the pan axis respect the support.

**I) RHorizon:** Activates the Real Horizon feature. If activated, the sensors of the head will hold the Roll axis in the real horizon position and the roll axis will not be controllable by the user. The function can be tuned in the [Horizon adjust menu](#) in the *Auxiliary* tab.

**J) 4Axis:** It activates the 4<sup>th</sup> axis movement. This function sets the movement of the pan controller to act respect the camera image when the head is tilted down.

**K) Stab Params:** If pressed, opens the menu for adjusting the drifts of the head. If hold, gives access to adjusting all the parameters of the head ([see chapter 4.8](#)).

**L) (Shortcut):** This area is reserved to set a shortcut access to different menus.

**M) Alarms display:** If any alarm or warning is activated will be displayed in this area.

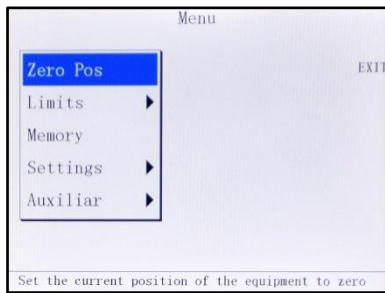
**N) Focus Distance:** Gives information of the focal distance if the lens information has been introduced into the system.

**O) Focal zoom:** Displays the focal zoom of the lens if the information is introduced into the system.

**P) Camera Run:** Information of the status of the camera (recording/no recording, speed of the shutter...).

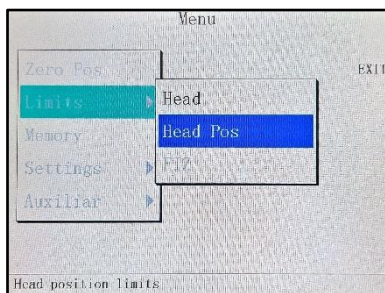
**Q) CT:** Displays the focal distance measured with the Cine tape.

## 4.2 OPERATION MENU

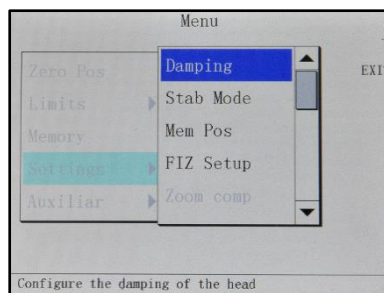


04.09 Menu dropdown tab

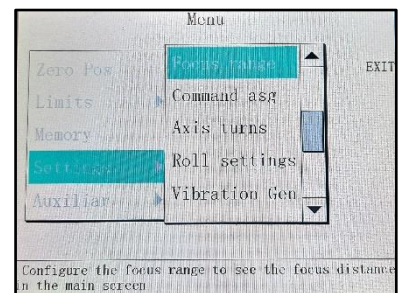
These are all the dropdown tabs available through the MENU button. Each menu is described below. Note that the grey tabs are only available when certain conditions are fulfilled.



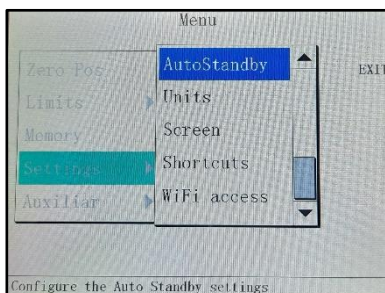
04.10 Limits menu



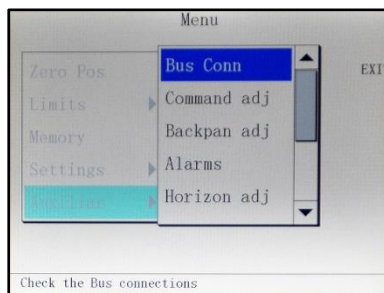
04.11 Settings dropdown 1



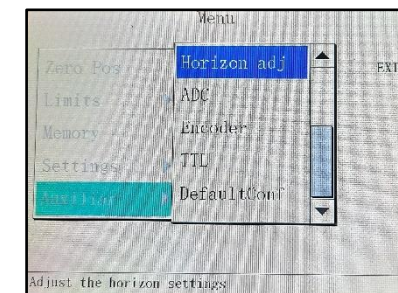
04.12 Settings dropdown 2



04.13 Settings dropdown 3



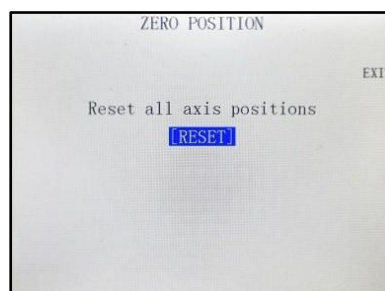
04.14 Auxiliary dropdown tab 1



04.15 Auxiliary dropdown tab 2

## 4.3 ZERO POS

In the Zero pos menu it is possible to set a 0 position for Pan to be displayed in the main screen. To do this, move the pan axis to the desired Zero Position and activate the reset button (fig. 04.16).



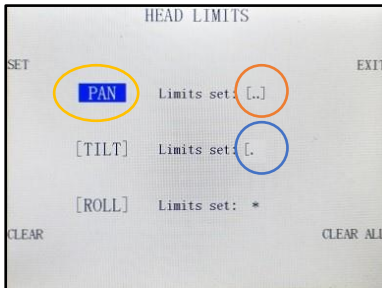
04.16 Zero Pos menu

For Tilt and Roll the zero position is always the horizontal position and it is set automatically. If the Zero position of the pan axis is not set, the system will always use the default zero position of the head.

The ZERO POS affects to the memories and the positions recorded from the system. Do a visual mark in the head in the ZERO POS in order to use memories or positions in different supports (for example, to record one memory in one support and play it back in another support and do the same movement respect the support, the ZERO POS must be the same respect both supports).

## 4.4 LIMITS

### 4.4.1 HEAD LIMITS



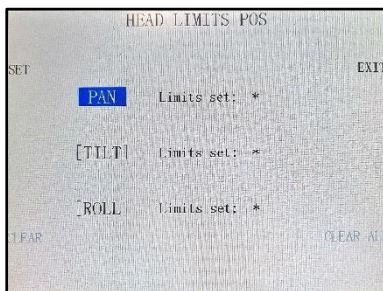
04.17 Head limits screen

- A- Axis selected
- B- Both limits set
- C- One limit set

This menu sets SAFETY limits on the movement of the head. To activate them, select the axis to be limited by pressing the name of it. Now move that axis in one of the desired limit points and press SET (fig. 04.17). One bracket (“[”) will appear indicating that the point has been saved. Now move the same axis to the other desired limit position and press SET again. Another bracket will appear ([..]), indicating that both limits are activated, and the movement of that axis is limited. To erase those limits, press CLEAR while the axis is selected. To erase all the limits of all the axes at the same time, press CLEAR ALL.

These limits can be used to prevent crossing axes. See *F.A.Q. chapter* for more information.

### 4.4.2 HEAD LIMITS POS

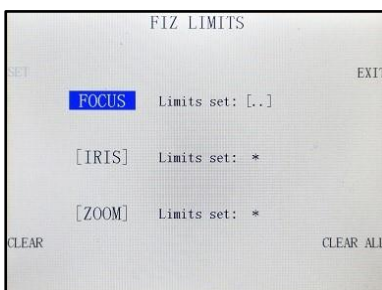


04.18 Head limits screen

These limits are OPERATION limits. These can limit the movement of the head in the absolute axis in order to use those limits as stopping points for the take. The procedure to set them is the same as in the head limits. These limits can not be used with the 4<sup>th</sup> axis feature activated.

**Note: These limits may slightly drift during time, re-check the limit before the take!**

### 4.4.3 FIZ LIMITS



04.19 FIZ Limits

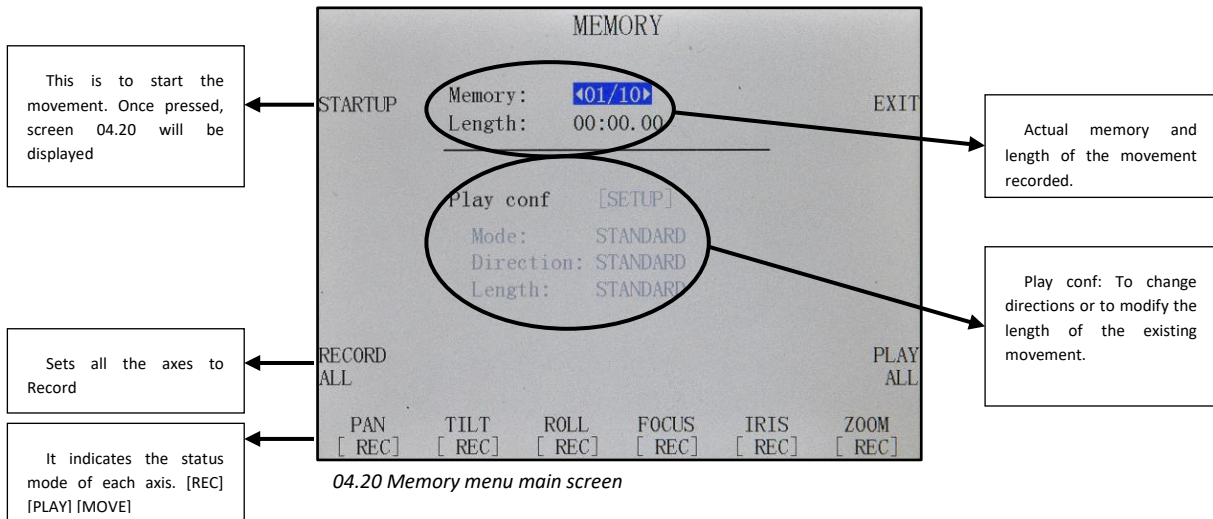
**FIZ Limits:** In this menu we can set limits for the movement of the Lens motors in case we use a Scorpio Focus. To set limits of movement is the same procedure as in the Head Limits menu.

**General note: The limits will remain even if the head stops communicating with the control. To ensure there are no limits on the head, restart the head and the limits will be erased.**

## 4.5 MEMORIES

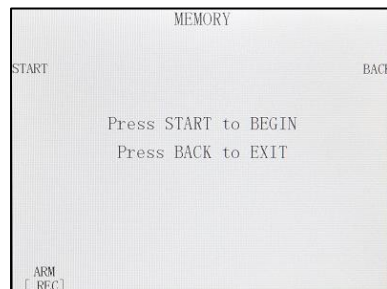
The Memory menu allow to record movements of the head either stabilizing or not and play them back several times. The recorded movement can be reproduced and modified afterwards. It also allows to change the direction of the movement or make a time lapse of the recorded movement.

The system records the memory directly to an SD card located inside the control desk. In case there is no SD card, the system will not allow you to go further on the memory menu.



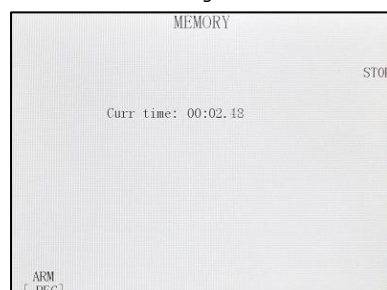
### 4.5.1 RECORD A MOVEMENT

There are 10 slots of memories of 1hour each. To record a movement, select which of those 10 memory slots will be recorded. Then, on the bottom left corner (*fig. 04.20*), ensure that the axes to be recorded are on REC. RECORD ALL button can be pressed to change all the axes states to REC.



*04.21 Start recording screen*

Now press STARTUP and the screen will change to *fig. 04.21*. While this screen is being displayed, no movement will be recorded, allowing the user to relocate the camera at the starting position for its movement. The START button triggers the memory and a time counter will appear (*fig. 04.22*) indicating that the memory is being recorded.



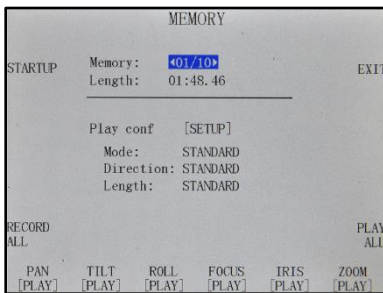
*04.22 Recording memory*

Once the take is finished, the STOP button finishes recording the memory. The maximum length of the memory can be up to 1hour.

**Note: All the memories are referred from the ZERO POS of the pan axis. Ensure to mark the ZERO POS before recording any memory into the system to prevent losing the ZERO POS.**

**Note 2: In case the user wants to record the lens, a Scorpio Focus must be connected by wire to the CCU and all the motors to be recorded configured as Internal. See the [FIZ Setup menu](#).**

## 4.5.2 PLAYBACK A MOVEMENT



04.23 Memory recorded screen

Once there is a memory recorded, the system allows different playing configurations to play/reproduce a recorded movement.

To playback a movement as it was recorded, change the status mode of the axes recorded to [PLAY] or press the PLAY ALL button (fig.04.23 bottom right corner) to change all the axes states to play.

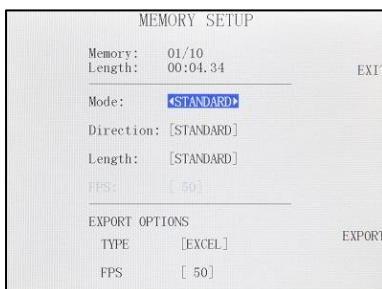
Then press the STARTUP button and the head will automatically go to the beginning position of the recorded movement (this action is called HOMING). Now fig 04.21 is displayed again. Press the START button in the touchscreen and the same movement recorded will be reproduced.

**Note:** The recorded movement can be stopped at any time by pressing the STOP button in the display.

**Note 2:** The memories can be recorded while in stabilized mode, but the precision of the playback may not be exact.

## 4.5.3 CONFIGURE AN EXISTING MOVEMENT

By pressing the [SETUP] button of an existing memory the user can access to modify that memory.



04.24 SETUP of a memory

### MODE:

- Standard: Regular playback mode.
- Stop Motion: It allows to playback the memory frame by frame. The FPS option sets how many FPS the user wants on the recorded memory.

### DIRECTION:

- Normal: Regular playback mode.
- Reverse: The playback starts in the end of the movement and ends in the beginning position of the recorded movement.

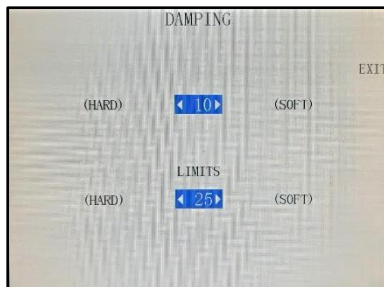
**LENGTH:** This is the length of the movement; it can be multiplied by two as many times as needed to make it slower.

**EXPORT OPTIONS:** with the EXPORT button a file is generated in the SD card. In this submenu it is possible to choose the type of file (ASCII or EXCEL) and how many FPS will have the exported file.

**Note:** the memories will remain in the SD card once recorded even if the head is switched off. The file in the SD card can be used in a different head of the same model and same PCB board types to reproduce the same movement.

## 4.6 SETTINGS

### 4.6.1 DAMPING

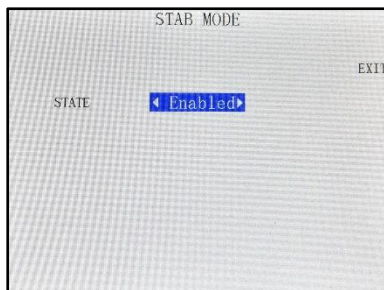


04.25 Damping menu

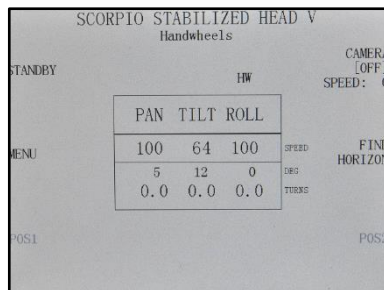
In this menu we can adjust the stopping ramp for all the axis of the head at the same time (*fig. 04.25*). The lower the value, the harder the stop will be.

It is possible to adjust independently the stopping ramp of the head when it stops at the limits. The lower the value, the harder the stop will be.

### 4.6.2 STAB MODE



04.xx Stab mode



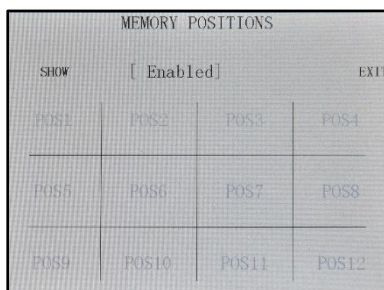
04.xxb Main screen on regular mode

In this menu it is possible to deactivate the stab mode by changing the state from Enabled to Disabled.

The regular mode can be used to prevent the drift movement on the memories for example, or to perform a 360° movement on the roll axis and cross axes.

The dropdown menu changes slightly, and a new mode become available: The focus track mode (*it is described in the [special modes chapter](#)*).

### 4.6.3 MEM POS



04.26 Memory position menu

In the Memory positions screen, it is possible to record 12 different positions for the head. To do so, move the head to the desired position and press and hold the memory slot where this position will be recorded. To move the head to that desired position, short press on the slot where it has been recorded and the head will move to that position automatically.

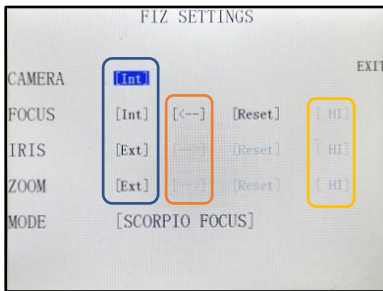
If the SHOW option is Enabled, on the non-stabilized mode will appear 2 positions in the main screen to have fast access to those positions.

**Note:** The positions recorded are referred to the PAN Zero Position. Visually mark the Zero position before using the memory positions to prevent to lose them in case of an unwanted disconnection of the system.

**Note2:** If the memory positions are used while the special mode tracking is enabled, it is possible to record space positions in order to point the camera to different positions in space (see Special Modes chapter on the Scorpio cranes user manual).

#### 4.6.4 FIZ SETUP

This menu gives access to configure parameters from the lens motors and camera run (fig. 04.27).



04.27 FIZ Set up screen

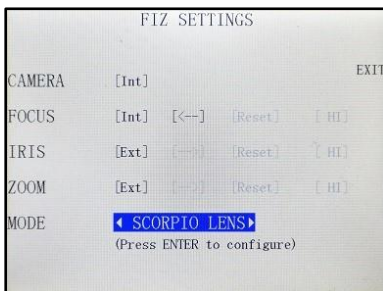
- A- Internal / External control of the axis
- B- Direction of the motor
- C- Speed of the motor

To modify any axis, press the parameter to modify directly. The first column defines how to control that axis: [INT] Means internally (from the control). [EXT] Means externally (from the Hand Unit or other devices).

With the arrows is possible to change the direction of the motors (for example in order to have the infinite in one end of the Focus potentiometer or the other). The [Reset] button recalibrate the desired motor to identify the travel length of the lens.

The last column adjusts the Speed of the motor and the strength of the motor when calibrating. [HI] is the highest value: the motor will be fast and will make more strength finding the end of the lens, [LOW] the slowest position and [MED] the medium value.

By pressing the Mode button, it changes between Scorpio Focus or Video Lens (fig. 04.28). This gives access to modify parameters of digital lenses.

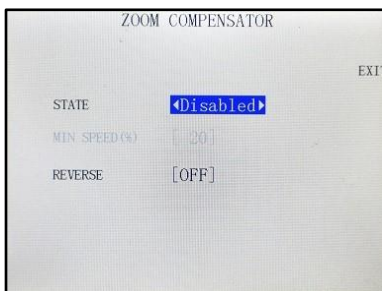


04.28 Scorpio Lens Control selected

**Note: All these menus are only available if there is a Lens Control system connected (Scorpio Focus or Servo Lens Control).**

#### 4.6.5 ZOOM COMPENSATION

This menu adjusts the speed of the head depending on the zoom's position (fig. 04.29).



04.29 Zoom compensator menu

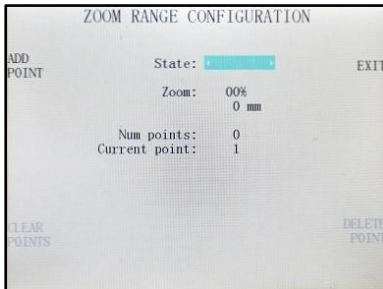
To activate it change the state from Disabled to Enabled. The MIN SPEED (%) value goes from 1 to 100 and it will define the speed reduction ratio (1 is 1% of the actual speed and 100 is the 100%). The Reverse will swap the direction of the speed reduction (depending in which side the motor is mounted in the camera package).

**Note: This menu is only available if there is a Lens Control system connected (Scorpio Focus or Servo Lens Control).**

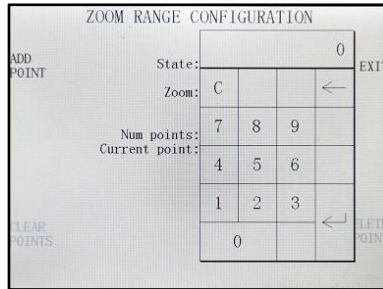
**The speed of the axes in the main screen will be displayed in purple color.**

### 4.6.6 ZOOM RANGE

This menu copies the lens zoom scale into the system.



04.30 Zoom range screen



04.30b Zoom Range keypad

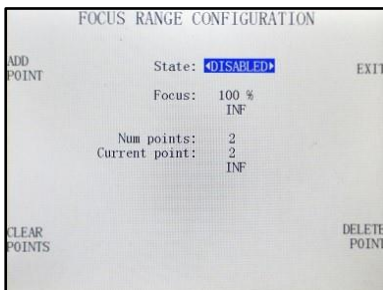
To start using it, move the zoom motor until one of the zoom marks on the lens is matched. In that mark, press the ADD POINT button (fig. 04.30). A keypad will appear to introduce the focal length of the mark using the enter button (fig. 04.30b). Now repeat the same process with the rest of the marks on the lens.

In case one of the marks is not introduced properly, can be erased by moving the zoom close to the mark and pressing the DELETE POINT button. To erase all the points, press the CLEAR POINTS button. Once all the marks are introduced, change the State to ENABLED and in the main screen will be displayed the actual focal length (as shown in the fig.04.04).

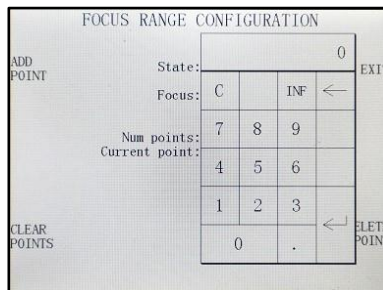
**Note: This menu is only available if there is a Lens Control system connected (Scorpio Focus or Servo Lens Control).**

### 4.6.7 FOCUS RANGE

This menu copies the lens focal scale into the system to be displayed in the main screen.



04.31 Focus range screen



04.31b Focus range keypad

To start using it, move the focus motor until one of the focal marks on the lens. In this mark press the ADD POINT button. A keypad will appear to introduce the focal distance mark (using the enter button). Now repeat the same process with the rest of the marks on the lens.

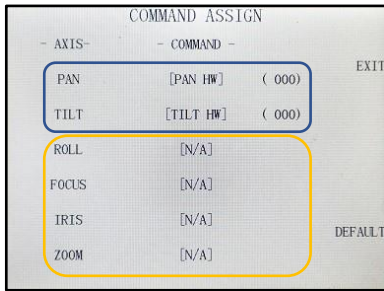
As in the Zoom range menu, in case one of the marks is not introduced properly, can be erased by moving the focus motor close to the mark and pressing the DELETE POINT button. To erase all the points, press the CLEAR POINTS button.

Once all the marks are introduced, change the State to ENABLED and in the main screen will be displayed the actual focal length (as shown in the fig.04.04).

**Note: This menu is only available if there is a Lens Control system connected (Scorpio Focus or Servo Lens Control).**

### 4.6.8 COMMAND ASSIGNMENT

This screen allows the user to control any axis with any command connected to the control.



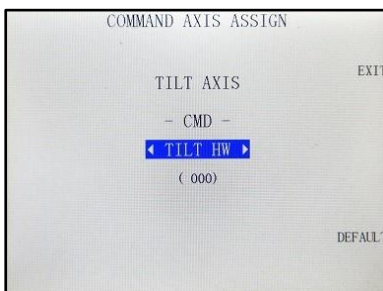
04.32 Command assign screen

The first column shows the axes to be controlled. The second one shows the different commands assigned to control each axis. The third one shows the movement of the Command (fig.04.32).

To change the assignment for one axis, select the command from the command column that controls that axis and the axis assignment screen will appear (fig.04.33).

**A-** Axes assigned

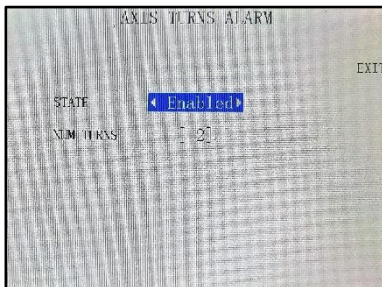
**B-** Not assigned axes



04.33 Assigning axis

In this screen, select the desired command by pressing the arrows and then exit. The new command will control the selected axis. The default button will set everything to the factory settings.

### 4.6.9 AXIS TURNS



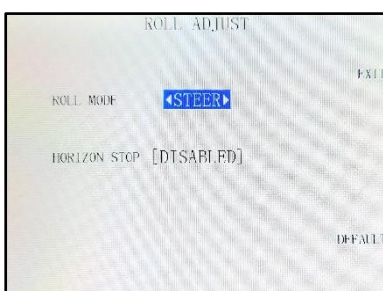
04.34 Axis turns alarm

In this menu it is possible to set an alarm after a certain number of turns on any axis. To activate it, change the state to ENABLED and adjust the number of turns that triggers the alarm.

In the main screen the axis that does more than the desired number of turns will be lighted in red, but the operator will still be able to keep moving the head.

### 4.6.10 ROLL SETTINGS

This menu changes the Roll Mode from STEER (fig 04.35) to Angle (fig.04.35b).



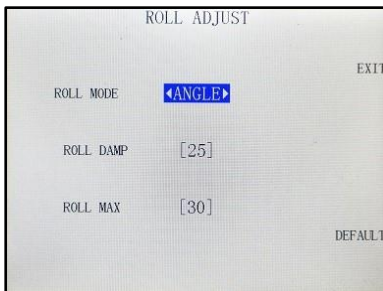
04.35 Steer mode in roll settings

In STEER mode, the user can change the horizon to a different point, and it will remain in that point, the operator has control of the roll axis.

It is possible to set the head to stop in the horizon every time the roll axis passes through it by Enabling the Horizon stop feature.

The ANGLE mode will make the head recover the horizontal position for the Roll after any movement in this axis.

ROLL DAMP parameter adjusts the speed of the head coming back to the center and the ROLL MAX parameter adjusts the maximum angle that the roll axis will reach.

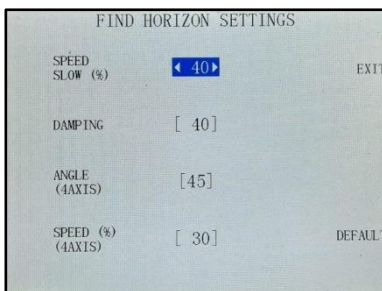


04.35b Angle mode in Roll mode

**Note: The changes made in this menu are only visible with the 4<sup>th</sup> AXIS OFF and the RHoriz OFF.**

**Note2: The default button will set everything to the factory settings.**

#### 4.6.11 FIND HORIZON SETTINGS



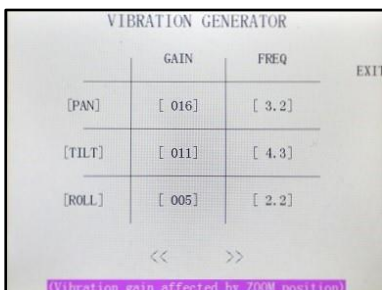
04.36 Find horizon settings.

The Horizon speed slow parameter can adjust the % of speed that the head will use when the FIND HORIZON button is hold for 2 seconds. The less %, the slower the head will move to the horizon.

It is also possible to adjust the DAMPING used by the head when the FIND HORIZON button is pressed. The ANGLE (4<sup>th</sup> AXIS) sets the degrees allowed on the mode 4<sup>th</sup> axis with real horizon mode and the SPEED (4<sup>th</sup> AXIS) adjusts the speed used by the head when it exits the 4<sup>th</sup> axis mode (see [working modes chapter](#)).

#### 4.6.12 VIBRATION GENERATOR

It is possible to generate vibrations in any axes of the head using this menu.



04.37 Vibration Generator

By pressing the axis name in this screen (*fig.04.37*), it activates a vibration in that axis and in the main screen that axis's speed will be marked in purple to indicate that a vibration is generated in that axis.

To modify the behavior if that vibration there are two parameters to be used: GAIN (*to adjust the amplitude of the vibration*) and FREQ. (*to adjust the oscillating speed of the vibration*).

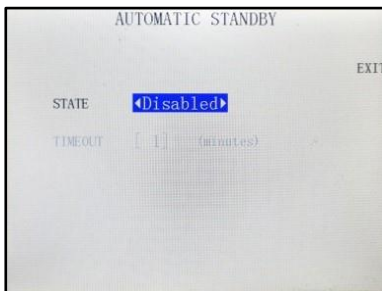
In case a Scorpio Focus is connected, the vibration will be adjusted to the zoom position according to the MIN SPEED % parameter on the zoom comp menu (see *Zoom Comp menu*). Also, the direction of the adjustment is affected by the REVERSE state in the zoom comp. menu.

If a shortcut of this menu is set, when pressed in the main screen it will activate all the axes at the same time.

#### 4.6.13 MOTION GEN

The motion generator has its own chapter inside the *special configurations chapter* of the *SCORPIO CRANES USER MANUAL*. In this menu is possible to set one tracking point for the focus motor. It needs a Scorpio crane connected to the head control or a cine tape connected to the head control using a Scorpio Focus system.

#### 4.6.14 AUTO STANDBY

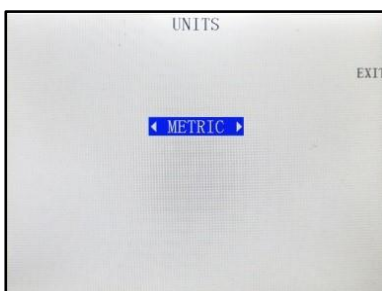


04.38 Automatic standby

In this screen is possible to make the head go to standby automatically. Set the STATE to ENABLE and set a timeout (*minimum 1 minute*).

After the timeout time, the head will change the state to standby mode if the control is not used.

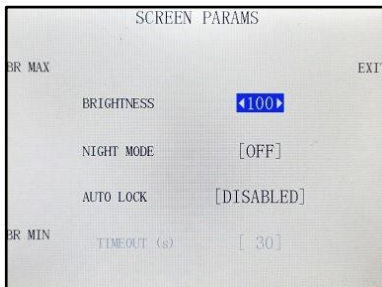
#### 4.6.15 UNITS



04.39 Units

Sets the scale used to show the units for the focal length. It can be metric or imperial.

#### 4.6.16 SCREEN



04.40 Screen set up parameters

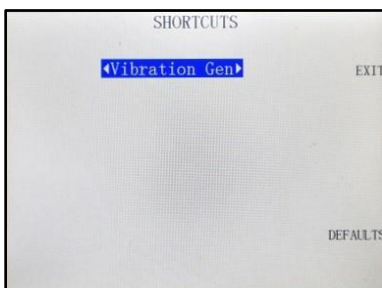


04.40b Night mode enabled

Changes the brightness from the display. Also is possible to enable the night mode (black screen with less backlight) or set an auto lock for the screen, a function that after a timeout locks the screen to prevent miss clicking on it.

If the screen is locked, on the bottom right corner will inform the user that the screen is locked. To unlock it, press anywhere in the display and confirm the willing of unlock it.

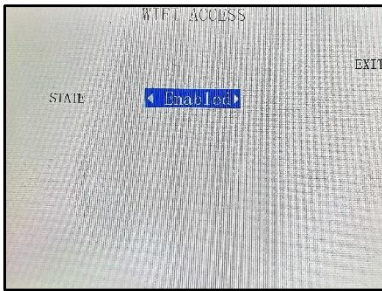
#### 4.6.17 SHORTCUTS



04.41 Shortcuts menu

It is possible to set different shortcuts in the main screen using this menu. Select the desired shortcut and it will appear in the main screen in the shortcut space.

### 4.6.18 WI-FI ACCESS



04.42 Wi-Fi access screen

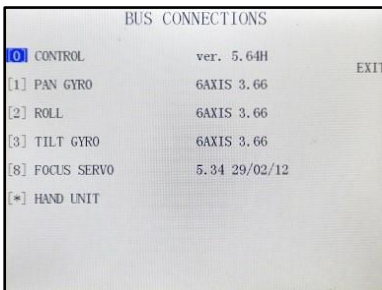
In this menu it is possible to enable or disable the access via Wi-Fi to the parameters of the head. To be able to connect to the head via Wi-Fi it is necessary to enable the state, if not it will not be possible to modify any parameter or activate any function via Wi-Fi.

To see how to connect via Wi-Fi with the head, see the *SCORPIO APP USER MANUAL*.

## 4.7 AUXILIARY

This is the service menu, there are different submenus that helps troubleshooting or verify the correct performance of the system.

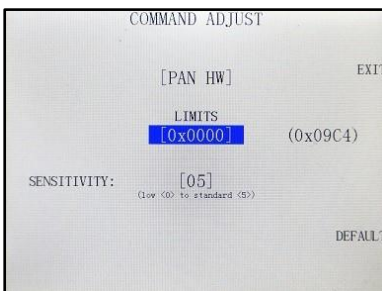
### 4.7.1 BUS CONNECTIONS



04.43 Bus connections

In this menu everything connected to the communication line will be displayed. Also, it is possible to see the Software version for each axis and, if the number of an axis is pressed, a screen will display more information referred to that axis.

### 4.7.2 COMMAND ADJUST



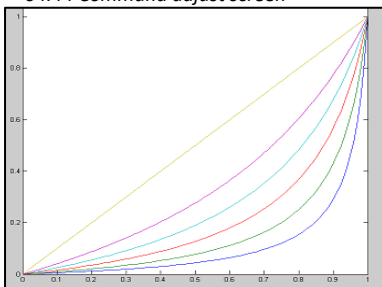
04.44 Command adjust screen

This menu allows the user to calibrate any command connected to the control. To calibrate the Handwheels for example, press the limits numbers in the middle of the screen (*fig.04.44*).

Move the controller Handwheel at the desired MAX speed and press ok. If it is a joystick that is being calibrated, move it to the maximum range of movement of the potentiometer.

The system will match the maximum speed of the wheel to the maximum speed of the head.

The sensitivity parameter changes the relation between the controller and the axis from a lineal relation (5) to an exponential relation by reducing this parameter until 0 (*fig. 04.45*). The more this value is reduced, the more exponential the relation.



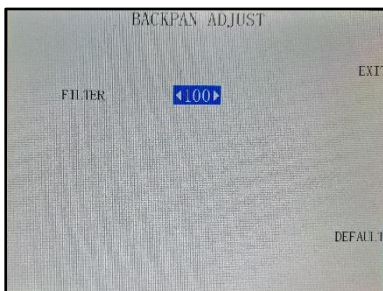
04.45 Sensitivity curves

In the analog controllers (Joysticks, rockers, potentiometers...) there is an extra parameter called WINDOW. It adjusts the range of the potentiometer where it can be moved, and the system will not make any movement on the controlled axis. It is also called Dead band.

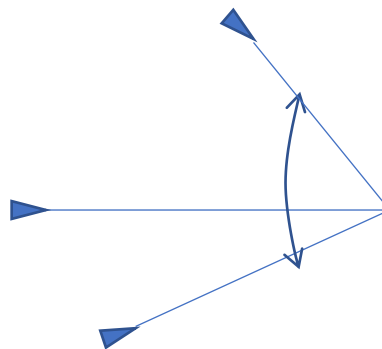
**Note: The *DEFAULT* button sets everything back to the factory settings.**

### 4.7.3 BACK-PAN ADJUST

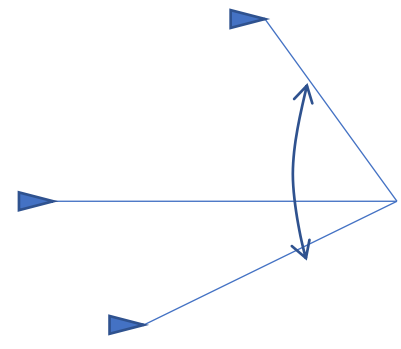
The Back Pan is a feature that makes the head hold the pan position even if the support where is mounted is spinning. All the stabilized heads have this feature, but the Mini Scorpio Stabilized V Head allows the users to deactivate the Back Pan feature without losing level of stabilization in order to make the head follow the support where is mounted (*it is very useful for camera cars in curved roads for example or in a circular circuit*).



04.46 Back pan adjust



04.62 Camera point of view without Back Pan



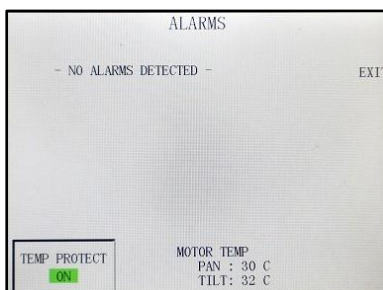
04.63 Camera point of view with the Back Pan activated

### FILTER

This parameter adjusts how much delay will be on the head when the support starts moving. The bigger the filter is, the more delay will be.

**Note: The parameters modification in this screen only affects the head when the BPan feature is switched OFF.**

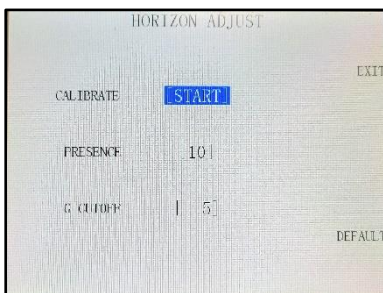
### 4.7.4 ALARMS



04.47 Alarms

The Stab V Head recognizes a series of different errors and displays an alarm in this Screen. Also shows the Motor temperature for the magnetic motors. It is possible to disconnect the temperature protection for the motors in case there is an error with these sensors. There is a more detailed explanation of all the alarms that can be displayed in the [F.A.Q. / Common problems chapter](#).

## 4.7.5 HORIZON ADJUST



04.48 Horizon adjust screen.

The R horizon is the feature that works for keeping the horizon of the remote head as the earth horizon all the time. To accomplish it, the system uses two kinds of sensors: gravity sensors and gyroscopes.

The gravity sensors are very good to know where the proper earth horizon is. In those situations where the head is summited to high external forces (*G Forces*) these sensors may not give a proper reading and then the second set of sensors take the lead: the gyroscopes.

The gyroscopes are sensors used to read the external forces affecting to the head and that reading is used to correct those forces and keep the same horizon. The handicap of the gyroscopes is the impossibility to have an absolute zero reading since there are always different external forces affecting to the head.

With a combination of both sensors the system is capable to hold the Real horizon in different situations. When the *G Forces* are not big enough to affect to the gravity sensors, both sensors are being used all the time. If those *G Forces* are big enough to mislead the gravity sensors, the system will stop using that reading and will use only the gyroscopes until the gravity reading is reliable again. A warning will be displayed in the main screen (*G-SHOCK*) to let the user know that the gravity sensor has been disabled by the system. Once the *G force* has stopped, the system will incorporate gradually the reading of the gravity sensors to ensure the head is in the Real horizon all the time.

It is recommended to let the electronics to warm up for at least 15 minutes before doing any adjustment in this screen (*the temperature affects to these sensors*).

**Note: All the parameters in this screen only affects the head if the R horizon feature is activated.**

### CALIBRATE

This option allows the user to readjust both sensors if needed. There are two kinds of calibrations once pressed START: the PARTIAL and the COMPLET. The PARTIAL calibration will adjust the drifts of the gyroscopes. To know if a PARTIAL calibration needs to be done it is necessary to see if the head drifts. In case it drifts in any axis, deactivate the stabilization, ensure the head is completely still and proceed with the PARTIAL calibration (*the process is the same as doing a ZERO AUTO in the Stab parameters screen*).



04.49 Position of the bubble level

Could be possible that even if the horizon of the head matches the earth horizon, the level of the camera does not match that horizon (*the camera platform is not perfectly leveled, tighten the camera to the head has been forced laterally, the bubble level of the camera is not calibrated...*). In those situations, a COMPLET calibration can be done to add an offset to the earth horizon to match the horizon of the camera. The best way to see if the horizon of the camera is different than the head, press the FIND HORIZON button on the main screen and verify the horizon.

To do this calibration, the camera platform must be leveled in ROLL and TILT axes (by using a bubble level on the camera platform). Once leveled, be sure that the head is completely still and proceed with the calibration. The head will set an offset to the horizon, and it will work from now on with that offset.

**Note2: Once the calibration has been selected it needs to be done, the only way to stop the system from doing it is switching off the control before it starts calibrating.**

---

## PRESENCE

This parameter should never be changed, only for testing or in special circumstances. It adjusts the relation of the gravity sensors signals into the systems. If it is decreased to 0, the signal of the gravity sensors is not used.

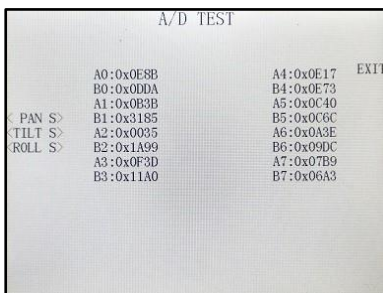
---

## G CUTOFF

This parameter adjusts under how much G Force the system will stop using the reading of the gravity sensors and will only use the gyroscopes. This is to prevent having incorrect readings of the gravity sensor. If the user sees the G SHOCK alarm almost constantly, even with the head almost still, this parameter needs to be increased. On the opposite, if the head experiences fast accelerations, the user does not see the G SHOCK alarm and the horizon is not hold properly (*it drifts*), this parameter can be reduced to improve the behavior of the horizon adjust.

**Note3: The “G-SHOCK” message is not an alarm, is just a warning for the user to inform that the gravity sensor reading is not being used, therefore it is not a problem if it is displayed in certain situations.**

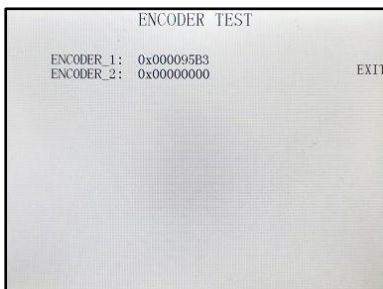
### 4.7.6 ADC



04.50 ADC converters

Displays the readings for the Analog/Digital converters. This screen is for troubleshooting, in case one potentiometer does not work, here is possible to see if the CCU have a reading for that potentiometer.

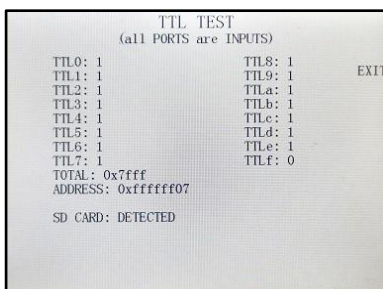
### 4.7.7 ENCODER



04.51 Encoder inputs

Displays the readings of the encoders connected to the CCU. In case the encoder signal does not change when the controller is moved, there is a problem with that controller.

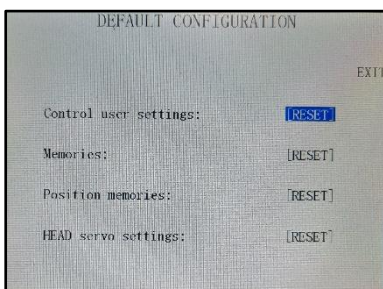
### 4.7.8 TTL



04.52 TTL Signals

Displays the digital inputs (buttons, selectors...). In case one button is pressed or one controller is connected a change in this screen will be seen.

### 4.7.9 DEFAULT CONFIGURATION

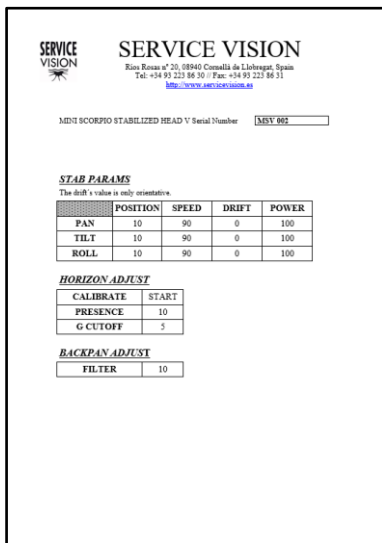


04.53 Default config

In this is screen is possible to reset the memories, the positions and set the user settings (damping...) back to the factory settings.

The head servo settings reset sets the Roll settings, the find horizon settings, the Wi-Fi access, back pan adjust, and horizon adjust settings to the factory values.

## 4.8 PARAMETERS OF STABILIZATION



04.54 Parameters of stabilization

With the Scorpio Mini Stab V Head, Servicevision provides a factory settings values for every specific head. Those values are meant to be used as standard values to allow the stabilization to perform at 75%-80% of its possibilities.

That being noticed, if the level of stabilization is not the desired or the head experience some vibration problems, it is possible to adjust some parameters of the stabilization.

It is very important to identify which parameter to adjust in any situation, therefore in the following chapters there will be an explanation of the function of every parameter and the situations where it needs to be adjusted.

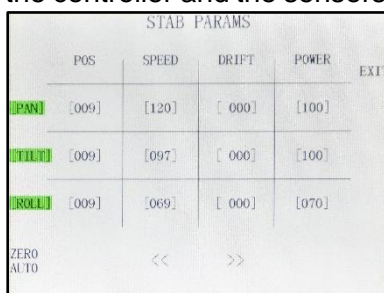
To access to these parameters, press and hold the STAB PARAMS button on the main screen. All the parameters will become accessible to be modified as desired.

### STAB PARAMS DEFINITION

The stabilization parameters adjust the behavior of the stabilization. For the best performance of the remote head, these parameters need to be adjusted for every specific camera package depending on the size of the camera package and the weight of it.

There are four parameters for every axis: POS, SPEED, DRIFT and POWER:

For all the axes the POS parameter adjust how tight those axes are going to be to the position marked by the controller and the sensors. The higher the value, the closer to the position marked by the controller and the sensors. A value of 10 is considered the standard because can be used in many circumstances. In case the head is going to perform nose mounted (*for example*), these values may be changed to prevent vibrations or to soften the movement.



04.55 Stab params screen

The SPEED parameter adjusts the stabilization itself. As the POS parameter, the higher the value, the tighter to the position marked by the sensors. The standard value for SPEED is considered 100, but it can be modified depending on the camera package and the performing position of the head.

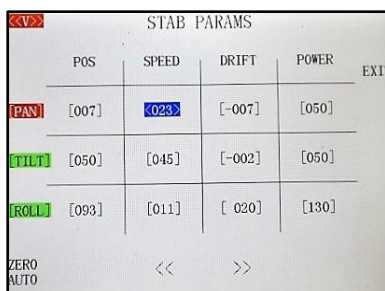
The Mini Stabilized V Head have different sensors to detect even the lowest vibrations getting to the camera. These sensors are quite sensitive to pressure and temperature changes and, depending on the conditions, the "still" position of this sensor changes. DRIFT parameter adjusts the offset added to these sensors in order to set a zero movement when there are no vibrations.

And with POWER it is possible to adjust the maximum power the system will apply to the motors in order to stabilize the camera package. 100 is the maximum torque and from there it can be decreased.

## ADJUSTING THE STAB PARAMETERS

To adjust the parameters, the head needs to be mounted and the camera package locked as seen in the [chapter 3: Set up the equipment](#). The stabilization of the axis that will be adjusted needs to be activated in order to see the effect of the changes done while adjusting.

### POSITION



	POS	SPEED	DRIFT	POWER	EXT
PAN	[007]	[023]	[-007]	[050]	
TILT	[050]	[045]	[-002]	[050]	
ROLL	[093]	[011]	[020]	[130]	
ZERO AUTO		<<	>>		

04.56 Pan axis vibrating alarm.

Activate the stabilization on the three axes and, with the R. Horizon OFF, move the axis to be adjusted at the desired shooting speed and make a sudden stop. If the head is able to stop correctly (*it does not bounce*) the value for position is correct. If it bounces, it needs to be decreased until the head can stop correctly.

If the movement looks delayed in that axis, it needs to be increased in order to follow tighter to the setpoint marked by the controller.

The default value for Position is 10. Normally this parameter will be decreased with heavy camera packages and/or unusual head configurations (*nose mounted, upside down roll movements...*). If the take is off on the roll axis, the tilt value might be increased to keep it tighter to the proper position.

### SPEED

To adjust the SPEED, increase the value until it vibrates and, from that point, decrease it until it stops. It is recommended to test it in different positions to verify that does not vibrate in any position (*one of the most critical positions is performing a full roll movement while tilted 45° down or up*).

### DRIFT

The system will readjust the drift automatically constantly. If the user still wants to adjust this parameter, it is necessary to see the image in the monitor and with the longest focal lens as possible.

Without moving the head or the support where it is mounted, check in the monitor to see if the image moves in one direction of the frame. If so, change this parameter for that axis in order to make it stop.

### POWER

This parameter adjusts the torque of the motors, the standard value is 100 which is the 100% of the motor torque and it is not needed to be modified.

### ZERO AUTO

By pressing this button, the head will automatically adjust the drift values for all the axes of the head. It is mandatory to disconnect the stabilization before pressing the zero-auto button and ensure that there are no vibrations coming to the head.

It is recommended to wait 10-15 minutes with the head powered before doing a zero auto calibration to ensure the sensors have reached the working temperature.

## 5 SECURITIES & RECOMMENDATIONS

Before delivering any product made by Servicevision, the product is completely assembled to detect and ensure there will be no problem in the assembly process and in the functioning of the systems once it is shipped to the destination.

All the parts and components designed by Servicevision are free of toxic, dangerous or hazard materials and there has been eliminated any sharp edges, avoiding the possibility of cutting.

### 5.1 BASIC SAFETY INFORMATION

There are several points to consider in order to operate the Scorpio Mini Stabilized V Head without any risk or danger:

- It is **MANDATORY** having perfectly balanced the Scorpio Mini Stabilized V Head and the camera package secured **BEFORE** operating the Scorpio Mini Stabilized V.
- Head technicians and operators must have received the proper formation through the training given by Servicevision.
- **DO NOT** disconnect or connect any cable while there is power in the system.
- **DO NOT** manipulate the camera package while the Scorpio Mini Stabilized V Head is communicating with the control (*use the standby button*).
- Check that the head can freely move, and it does not get stuck in **ANY POSITION** before start communicating with the control. If so, readjust the head until it can freely move in all the axes.
- Ensure the cables going into the camera will not get stuck in the movement of the head by securing them properly.
- Pay **ATTENTION** to the twist of the cables. If needed, undo the turns on the axes to prevent them to break.
- **DO NOT** force the motors while the system is engaged.
- **ENSURE** the axis lockers are open before starting the head.
- When the Scorpio Mini Stabilized V Head is performing under the rain, **PROTECT** the camera package from getting wet.
- **ALLWAYS** work with the safety caps on the bars to prevent the bars to slide completely off.

### 5.2 RECOMMENDATIONS

- Do not switch off while manipulating parameters of stabilization, it might change those values to random values.
- Mount the designed Mitchel mount for every situation (*for example: Do not mount the Fix adaptor if the head is going to be in a camera car off road*).
- Do not block the movement of the motors when wiring the camera package.
- Do not leave the axis vibrating for long periods of time, it may damage the motors.

## 6 MAINTENANCES

### 6.1 MAINTENANCE REQUIREMENTS



Any maintenance must be done only by personnel trained by Servicevision. Servicevision will provide the certificate as Maintenance technician.

The Maintenance technician will decide how often and the works to do depending on the shooting conditions on the previous shooting and the reports received from the operators and the technicians on location.

### 6.2 GENERAL MAINTENANCE

For a proper and correct maintenance, the Scorpio head must always be inspected before and after every shooting. The parts to be checked or changed will be under the maintenance technician judgement. As well as the parts to be cleaned since the conditions under the head has been exposed in the previous days can be different every time.

**Note: Before doing any maintenance on the Head, be sure that the system is switched off or the standby button is pressed unless it is specified in this manual.**

#### CLEANING

The Mini Stabilized V Head is a light head designed to perform in harsh environments. Therefore, it is mandatory to clean it every time it is exposed to those environments. To clean it use a dry rag and a brush to remove the dust from it or apply degreaser to the rag to remove the grease of the machine. Compressed air can be used to reach the hard to access places. The carbon fiber bars need to be dry and clean to facilitate the movement of the bracers along them.

#### ALIGNMENT OF THE CARBON FIBER BARS



06.01 Alignment bracket attached

If all the knobs of the “L” shaped bars are loose at the same time, it is possible that the pan and roll axes lose the alignment and the head loses the balance. To align the bracers again, move the pan axis and the roll axis to the end of the bars. Attach the alignment bracket to the bars and tight one of the axes to the bars to prevent them to move. Now the bracket can be removed, and the axes can be moved one at a time ensuring the alignment will not be lost.



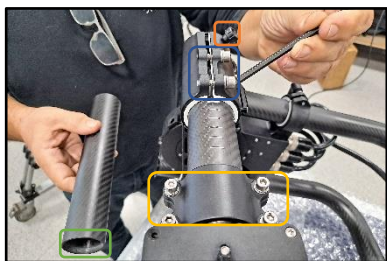
06.02 Radio bracket used to align

The Radio bracket and the 40mm bracket can be used also to align the bars when the head is nose mounted. Attach the brackets on both bars on the pan axis (*fig. 06.02*) to prevent the bars to fall once all the knobs are loose. Move laterally the roll axis until the head holds the position when the head has the roll on the bottom (*or the top*) and then tight all the knobs again and remove both brackets.

---

## REPLACE THE ROLL-TILT CARBON FIBER BARS

To change the Roll-Tilt bars it is necessary to put the tilt axis at 90° and change the bars one by one. Remove the rear cover hold by the knob and the bracer holding the tilt axis. Loose the bracer of



06.03 Roll-Tilt bar

A – Knob for rear cover

B – Tilt bracer

C – Roll bracer

D – Lip facing the tilt

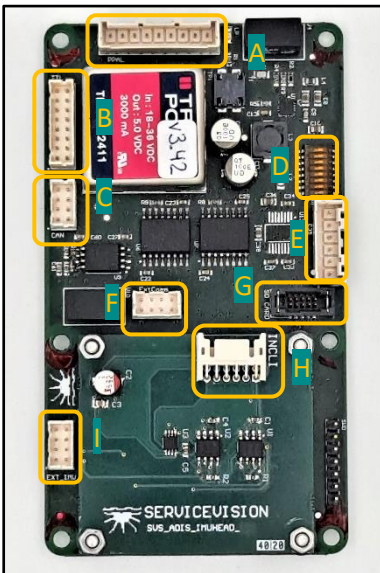
the roll “U” and pull the bar back until the connector for the tilt is accessible. Use an adjustable plier to open the connector and pull from the cable from the roll side. Once the cable is out, Pull the bar out and introduce the new one. Notice that the carbon fiber bars have position, there is one lip in one side of the bar. This must face the connector side. Pass the bar into the bracer, the cable into the bar and connect it using the adjustable plier until the connector is locked. Push the bar to the mechanical limit with the tilt axis and attach the tilt bracer. Attach the rear cover and then tight the roll bracer. Turn the roll axis 180° and repeat the same operation with the other tilt axis.

## REPLACE PCB BOARDS

### BOARDS DESCRIPTION

There are 2 different kind of PCB boards in the Stabilized V Head: The main servo board (*the main board of the head*) and the driver boards.

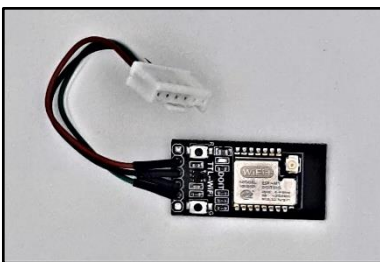
The main board is on charge of all the functions of the head (*stabilize, move the motors, and communicate with the control among others*). The detail of the connectors in the main board are:



06.04 Servo board for Mini Stab V

- A. PPAL: This is the main connector of the board. The communication lines come into this connector as well as the power for the board.
- B. TTL: This connector is used to send the encoder information through the DATA connector from the head.
- C. CAN: This is the communication line with all the drivers of the head.
- D. Switch: This switch is an address switch to let the servo board know which function is doing.
- E. Wi-Fi: This connector communicates with the Wi-Fi device.
- F. Ext\_Comm: This connector is not used on the Mini Stab V.
- G. SD CARD: This connector is used to load software to the PCB board.
- H. INCLI: The sensor under the camera platform is connected here.
- I. EXT\_IMU: The sensor on the outside side of the master tilt axis is connected here.

There are 3 driver boards, one on each axis. Those drivers control the motor for each axis and they are programmed by factory. There is no need to do any adjustment on the drivers.



06.05 Wi-Fi module inside the head

There is a Wi-Fi module inside the head connected to the Wi-Fi connector of the main PCB board. This device allows the head to be connected with a smartphone (*or similar devices*) and change some parameters for the head from the phone. To see how to use the app, please refer to the *SCORPIO APP USER MANUAL*.

This Wi-Fi devices has an address assigned by Servicevision matching the serial number of the head.

### BOARDS LOCATION

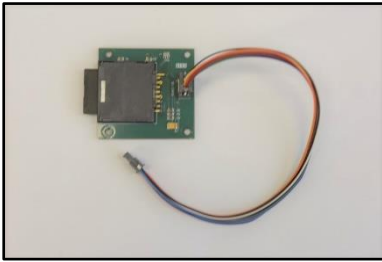
The location of the boards is the next one:

<i>Inside inner cover of the Master tilt</i>	-Servo board for Mini Stab, Wi-Fi module.
<i>Inside the squared cover on the pan axis</i>	-Driver for the pan motor
<i>Inside the squared cover on the tilt axis</i>	-Driver for the tilt motor
<i>Inside the squared cover on the roll axis</i>	-Driver for the roll motor

To have access to the specific PCB board, open the assigned cover and replace all the connectors from that board. The drivers are attached by two screws on the rear part of the cover. Detach the driver from the rear part and replace the driver. For the main PCB board, ensure that all the DIP switches from the new board are the same than the board to be replaced.

## UPDATE THE SOFTWARE FOR THE MAIN SERVO BOARD

The main board of the Mini Stab V has a connector for an SD Card reader. The SD Card reader is inside the CCU and can be used to update the software of the 6axis board (*fig. 06.06*).

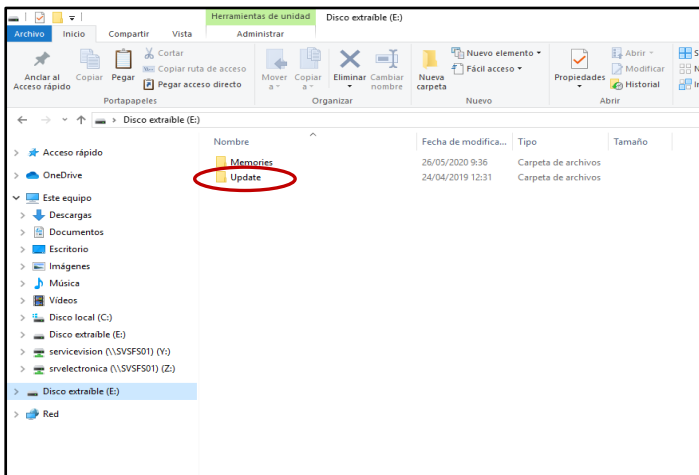


06.06 SD Card reader

To LOAD software in the boards the software needs to be inside an SD Card. Servicevision will send to the users a new software every time it is developed and verified. This software will be a file called "XXXX.bin" (where XXXX is the name of the file).

Copy the software file (\*.bin) inside the SD card in a folder called UPDATE. The access path should be:

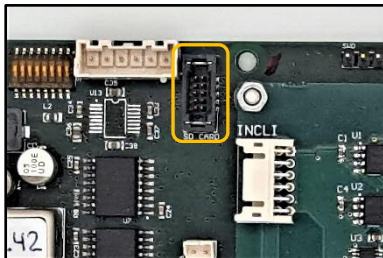
X:\UPDATE\\*.bin. (X is the name of the SD CARD in the computer).



06.07 Folder called UPDATE inside the root of the SD CARD

Once the file is in the folder called update, introduce the SD card into the SD Card reader and connect the reader to the Board (*fig. 06.08*).

Apply power to the head and keep the reader connected. The LED from the head will start flashing RED/GREEN until the LED starts flashing orange. Switch off the head and disconnect the SD card reader. Now the software has been updated.



06.08 SD card reader connector

**Note: Wait until the LED in the head starts blinking in orange before switching it off and remove safely the SD card reader.**

## UPDATE THE SOFTWARE FOR THE CONTROLS



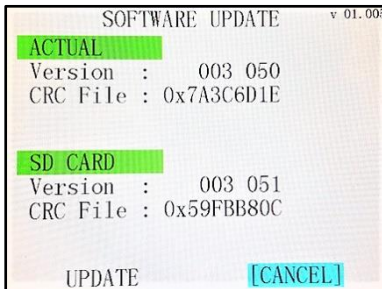
06.09 SD card slot in the controls

The CCU controls all the functions that the head/crane can perform. There are two different kind of software for the CCU depending on if it is inside a crane or in a control for the head. To identify them, in the name of the file there is an H for head or a C for crane (for example "CCU\_ **H**.v05.68xxxxx.bin").

Copy the software file (\*.bin) sent by Servicevision inside the SD card in a folder called UPDATE. The access path should be:

X:\UPDATE\\*.bin. ("X" is the name of the SD CARD slot in the computer).

Once the file is in the SD Card inside the folder called update, introduce the SD card into the SD card slot in the control. Apply power to the control and the *fig. 06.10* will be displayed in the screen.



06.10 Update screen

To update the software, press the UPDATE button and the software from the SD card will replace the actual software version from the control.

**Note: Ensure that in the folder UPDATE there is only one software to be loaded and it is a head software.**

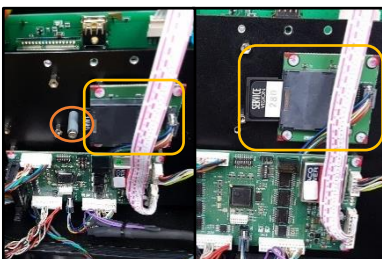


06.11 Allen screws from the control



06.12 Philips screws from the frontal.

In case there is no SD Card reader on the rear part of the main control, the SD Card reader will be inside the control. To access to this SD Card reader, the 4 Allen screws holding the upper part of the control must be removed. To access to the last Allen screw, the 6 Philips screws Holding the frontal panel needs to be removed.



06.13 SD Card reader with and without stopper

With the frontal part open, identify the SD Card reader and remove the stopper holding the SD Card inside. Now the SD Card can be removed by pushing it inside. Introduce the software in the SD Card, verify that everything is connected and close the frontal panel. Now start the control and the *fig. 06.10* will be displayed in the screen.

To update the software, press the UPDATE button and the software from the SD card will replace the actual software version from the control.

**Note: For safety, do not start the control if the frontal part is not closed, there is a risk of shortcut.**

## 7 F.A.Q. / COMMON PROBLEMS

### 7.1 ALARM DISPLAY

The Stab V Head displays a series of different error signals or alarms. The user can find the following alarms:

Name of the alarm	Description
<b>Real Horizon not detected (red)</b>	<ul style="list-style-type: none"> <li>-The RHorizon feature did not identify some sensors. It could be caused by a failure of a sensor, or one cable broken or disconnected.</li> <li>-Restart the head.</li> <li>-Disconnect the camera power cable from the head (<i>To verify it is not causing electric noise</i>).</li> <li>-Check the connector INCLI on the servo board (see <a href="#">boards description chapter</a> to identify it)</li> </ul>
<b>Real Horizon detected errors (red)</b>	<ul style="list-style-type: none"> <li>-The RHorizon feature cannot work properly. It could be caused by a failure of a sensor, or one cable broken or disconnected.</li> <li>-Restart the head.</li> <li>-Disconnect the camera power cable from the head (<i>To verify it is not causing electric noise</i>).</li> <li>-Check the connector INCLI on the servo board (see <a href="#">boards description chapter</a> to identify it)</li> </ul>
<b>Temperature (red)</b>	<ul style="list-style-type: none"> <li>-This alarm appears when one or different direct drive motors' temperature has reached critical levels. At 90°C the alarm will be displayed. At 110°C, the corresponding motor will be disabled to prevent any damage caused on the motor.</li> <li>-If for any reason (<i>sensor error, etc.</i>) the user wants to disconnect the temperature protection, it can be disabled pressing the button in the left bottom corner on the alarms screen.</li> <li>-Check if the direct drive motor is mechanically locked. That could be the reason of the overheating.</li> </ul>
<b>GShock (purple)</b>	<ul style="list-style-type: none"> <li>-The head has stopped using the gravity sensors.</li> <li>-If the alarm does not fade away when the head is still, increase the value of the G-Cutoff parameter in the Horizon adjustment screen.</li> <li>-If it persists, do a COMPLET calibration on the RHorizon.</li> </ul>
<b>Axis vibration (red)</b>	<ul style="list-style-type: none"> <li>-The axis (PAN, TILT or ROLL) is vibrating, check if there is something loose in the camera package, if not, adjust the parameters for the stabilization (<i>Decrease the speed on that axis</i>).</li> </ul>
<b>[Axis]: encoder error (red)</b>	<ul style="list-style-type: none"> <li>-There is an incoherence between the encoder signal received and the expected encoder signal. The head goes to standby, and it is necessary to restart the control to reengage the head.</li> <li>-Verify that the Mitchell mount on the head is properly tight.</li> </ul>
<b>Axis disconnected (red)</b>	<ul style="list-style-type: none"> <li>-One of the axes has been disconnected due to a high-power consumption or an incoherence between the actual position of the head and the expected position of the head.</li> <li>-Restart the control</li> <li>-Change the cables between the control and the head.</li> <li>-Change the inner cables of the head going to the servo board of the head</li> </ul>

**Note: If any of these alarms persists after readjusting the system correspondingly, contact Servicevision for further troubleshooting.**

## 7.2 COMMON PROBLEMS

In the following table there is a relation of the most common problems the users may find while operating the Head and the possible solutions to those problems:

Symptom	Procedure to follow
The Head is drifting	<ul style="list-style-type: none"> <li>-Identify the drifting axis</li> <li>-Verify that with stabilization OFF is not drifting.</li> <li>-If without stabilization it still drifts, verify the calibration from the controller of that axis (<a href="#">chapter 4.6.2 Command adjust</a>).</li> <li>-If the head has the stabilization ON, adjust the DRIFT parameter accordingly or press the ZERO AUTO button to recalculate the DRIFT values.</li> </ul>
The level of stabilization is not the desired.	<ul style="list-style-type: none"> <li>-Check the camera package to identify any loose part and tight it.</li> <li>-Check the balance of the camera package and rebalance if needed.</li> <li>-Readjust the parameters for the stabilization by increasing the speed value and ensure the power is at 100.</li> </ul>
There is a buzzing noise coming from the head. / The head is vibrating.	<ul style="list-style-type: none"> <li>-Identify the axis that is causing the buzz/vibration by switching OFF the stabilization axis one by one until it stops.</li> <li>-Verify that the camera package is balanced and fixed.</li> <li>-Verify that the Mitchell mount is firmly tight.</li> <li>-Readjust the stabilization parameters in that axis by decreasing the SPEED value until it stops.</li> </ul>
The head bounces when its moving.	<ul style="list-style-type: none"> <li>-If the camera package is heavy and gets inertia on the movement, the head will not be able to stop it fast enough. Increase the value of the <i>Damping</i> or decrease the value of position in the stab params from the axis that bounces until it does not bounce on the stops.</li> </ul>
The Head does not communicate with the control.	<ul style="list-style-type: none"> <li>-Verify the status of the Standby button on the Head.</li> <li>-Check that the main connector in the Head is properly locked.</li> <li>-Check the cables between the Head and the control (<i>Communication cable, SSV Adaptor to standard Scorpio</i>).</li> <li>-Check the master TILT side cable or the PAN-ROLL cable.</li> </ul>
The Horizon is not holding properly ( <i>it is not the same when tilting the camera up and down</i> )	<ul style="list-style-type: none"> <li>-Verify there is no drift on any axis by doing a zero auto while the head is not moving.</li> <li>-Verify the position of the dove tail respect the camera platform (<i>if the camera is not facing straight front respect the camera platform this phenomenon may occur</i>).</li> </ul>
When the Find Horizon is pressed, it doesn't find the Real Horizon	<ul style="list-style-type: none"> <li>-Check that the axes of the head have the stabilization activated (<i>if they are not activated, the find horizon button finds the middle point of the roll axis</i>).</li> <li>-If when the <i>Find Horizon</i> button is pressed the horizon is not the proper one, a COMPLET calibration needs to be done in order to add an offset to the horizon (<a href="#">chapter 4.7.5 Horizon Adjust</a>).</li> </ul>
The head performs a tilt movement when moving the pan controller	<ul style="list-style-type: none"> <li>-After changing one working mode or going to standby, the head did not get the position properly, press standby or change the working modes with the camera platform more or less leveled.</li> </ul>
There is an alarm in the display	<ul style="list-style-type: none"> <li>-Check the <a href="#">chapter 7.1 Alarm display</a> for detailed information about the alarm</li> </ul>
The roll axis always returns to the center	<ul style="list-style-type: none"> <li>-Check the roll mode screen. It might be in angle mode.</li> </ul>
The head moves at low speed after a sudden movement	<ul style="list-style-type: none"> <li>-The head has entered in the current limited mode to prevent the motor to be damaged. As soon as the head is stable this mode will be automatically disabled. This event can occur when the axes of the head are crossed, or the demand of current is too high.</li> </ul>

The head has been moved with the safety pin locking the movement	-The head will automatically enter in the current limited mode and no damage will be done to the equipment. -Open the locking pin and work normally.
When working in memories it does not go to the home position exactly	-Ensure the drift is properly adjusted. -Due to the nature of the head, it might be slightly off when homing. To improve it slightly, when the head finishes the homing, go back to the memories screen, and start up again without moving the head ( <i>this time will be more precise</i> ).

**Note: If any of these problems persists after readjusting the system correspondingly, contact Servicevision for further troubleshooting.**

### 7.3 COLOR MESSAGES

There are different states or messages that can be identified by different colors on the main screen. The color code used for the different messages is the next one:

Red labeled message in the middle screen.	-Different alarms: check the <a href="#">chapter 7.1 Alarms display</a> for further information.
Red number of turns in one axis	-Axis turns alarm activated. Check the <a href="#">chapter 4.6.9 Axis turns</a> for further information.
Purple labeled message in the middle screen	-Alarms (G-Shock): check the <a href="#">chapter 7.1 Alarms display</a> for further information.
Purple changing number in the actual speed of one axis.	-Axis vibration activated on that axis. Check the <a href="#">chapter 4.6.12 Vibration generator</a> for further information.
Purple speed value of all the axis.	-Zoom compensator activated. Check the <a href="#">chapter 4.6.5 Zoom Compensator</a> for further information.
Purple LOCKED label on the bottom right corner	-Screen locked: check the <a href="#">chapter 4.6.16 Screen</a> for further information.

## 8 WORKING MODES

The Scorpio Mini Stab V Head can perform in any position as far as the axes do not cross each other. The reason why the axes cannot be crossed is because when two axes are crossed (*or aligned*), two axes are doing the same movement and the head cannot perform properly (*this can happen when the roll axis is moved until the tilt axis is aligned with the pan*). In this situation the head may experience vibrations and only two axes can be controlled.

That being says it is possible to differentiate 5 different working modes. Each of those working modes have different limitations besides the possibility to cross axes.

### 8.1 2 AXIS HEAD & REAL HORIZON

This is the most common mode; the operator will be able to control PAN & TILT, but the ROLL axis will be controlled by the system to hold the REAL HORIZON. The head can be over or underslung and the mount can be off by up to 60° without any limitation on the movement on PAN & TILT axes. The main condition of this mode is that the ROLL axis will be controlled by the system and the operator will not be able to change it for the take. The movement of the PAN & TILT are respect the real horizon.

To use this mode, the status of the main screen functions is the next one:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[ON]	[ON]	[ON]	[ON]/[OFF]	[ON]	[OFF]

The BPan can be ON or OFF depending on the circumstances, if the head is in a camera car or the position of the camera must be the same respect the support it can be switched OFF to avoid pan corrections respect the support without affecting to the stabilization.

### 8.2 PAN, TILT & ROLL NON-STABILIZED

In this mode the operator has full control of the three axes of the head: The pan controller will move the pan axis; the tilt controller will move the tilt axis and the roll controller will control the roll axis. The head can move 360° on the roll axis with the cables limitation and allows to use the *Tracking mode* with the Scorpio Cranes.

To use this mode, the status of the main screen functions is the next one:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[OFF]	[OFF]	[OFF]	[ON]/[OFF]	[ON]/[OFF]	[ON]/[OFF]

The BPan, the RHorizon and the 4<sup>th</sup> axis can be ON or OFF, there will not be any difference since those functions are only available if the stabilization of the three axes is ON.

### 8.3 PAN, TILT & ROLL STABILIZED

In this mode the operator has full control of the three axes of the head: The pan movement will be referred to the real horizon as well as the tilt movement. In this mode the roll axis can be moved up to 60° respect the pan axis and it is possible to do a complete 360° roll (*with the mechanical limitations of the design*) only if the tilt axis is pointing at more than 30° respect the pan axis (*the axes will not cross each other*).

To use this mode, the status of the main screen functions is the next one:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[ON]	[ON]	[ON]	[ON]/[OFF]	[OFF]	[OFF]

The BPan can be ON or OFF depending on the circumstances, if the head is in a camera car or the position of the camera must be the same respect the support it can be switched OFF to avoid pan corrections respect the support without affecting to the stabilization.

It is recommended to set HEAD limits on the movement of the roll axis to prevent crossing axis. If it is necessary to do a complete roll movement with the tilt axis pointing at less than 30° respect the Mitchell mount it is possible to switch OFF the stabilization of the ROLL axis only to do this specific movement; the head will not stabilize 100% but allows the operator to cross axis to do the take while stabilizing PAN and TILT.

It is also possible to set stopping points in the horizon ([chapter 4.6.9: Roll settings](#)) to ensure that at the end of the take the roll will be horizontal (*only works with all the axes stabilizing*).

## 8.4 FOURTH AXIS

The 4th Axis can be enabled to perform a panoramic movement respect the camera image and not respect the real horizon. This becomes useful when the camera is tilted down, and it is necessary to do a panoramic movement in this position. The main handicap in this mode is that if the roll axis is off leveled when the camera is tilted up again, it will be off and it is necessary to correct the roll manually to set the horizon. It is recommended to set a stopping point in the horizon ([chapter 4.6.9: Roll settings](#)) to ensure that at the end of the take the roll will be horizontal as the tilt is going up. On the [chapter 4.6.10: Find horizon settings](#) it is possible to adjust the maximum degrees of fourth axis.

To use this mode, the status of the main screen functions is the next one:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[ON]	[ON]	[ON]	[ON]/[OFF]	[OFF]	[ON]

The BPan can be ON or OFF depending on the circumstances, if the head is in a camera car or the position of the camera must be the same respect the support it can be switched OFF to avoid pan corrections respect the support without affecting to the stabilization.

It is recommended to set head limits on the movement of the roll axis to prevent crossing axis.

## 8.5 FOURTH AXIS WITH RHORIZON

There is the possibility to use the fourth axis and the real horizon at the same time. On the [chapter 4.6.10: Find horizon settings](#) it is also possible to adjust the degrees and the damping used by the head to find the horizon as the camera is being tilted up. The fourth axis will be limited to the programed degrees and if the head is tilted to the horizon beyond those degrees, it will automatically find the R horizon.

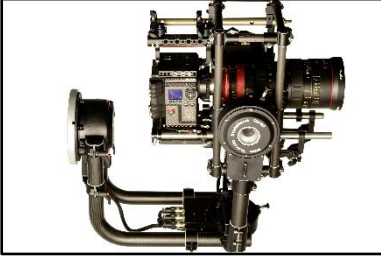
To use this mode, the status of the main screen functions is the next one:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[ON]	[ON]	[ON]	[ON]/[OFF]	[ON]	[ON]

The BPan can be ON or OFF depending on the circumstances, if the head is in a camera car or the position of the camera must be the same respect the support it can be switched OFF to avoid pan corrections respect the support without affecting to the stabilization.

## 8.6 NOSE MOUNT

The Mini Scorpio Stabilized V head can perform when it is nose mounted in any of the previous modes explained in this chapter, the only difference is the axis that will be moved when performing a movement with the stabilization activated (*for example: a panoramic movement with the head underslung is done by the pan axis and if the head is nose mounted, it will use the roll axis or both depending on the position of the Mitchell mount*).



08.01 Nose mounted with the roll at the bottom

To have the maximum range on the panoramic axis the roll axis must be on the top or on the bottom of the head as shown in *fig.08.01*. If the Mitchell mount is at least 30° off to the vertical, it is possible to do a 360° panoramic movement with the mechanical limitations of the head (*the axes shall not cross*).

To use this mode, the status of the main screen functions is the next one:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[ON]	[ON]	[ON]	[ON]/[OFF]	[ON]/[OFF]	[ON]/[OFF]

It is recommended to deactivate the BPan in this mode to prevent the corrections on the pan axis and accidentally cross the tilt axis with the pan axis. Head limits can be used too to limit the movement of the roll axis and prevent this situation to occur. Besides that, the RHorizon, the 3 axes or the 4<sup>th</sup> axis modes can be used normally.

It is recommended to set head limits on the movement of the roll axis to prevent crossing axis.

## 8.7 ROLL RING

When the Roll Ring is connected to the head it is necessary to restart the head and set the horizon for the roll ring by moving the roll to the horizon point and hold the FIND HORIZON button for 3 seconds. This point must be found while the Stabilization of the axes and the RHorizon are ON.

Also, when the FIND HORIZON button is short pressed, the speed of the head finding the horizon will be determined by the configuration of the [chapter 4.6.10: Find horizon settings](#).

When the roll ring is connected, the head will use the 4 axes (*Pan, Tilt, Roll and Ring*) as needed in order to perform the camera movements and prevent the axes to cross each other overpassing any movement limitation. The speed that the head will use to readjust itself in order to allow any camera movement can be adjusted on a new auxiliar menu that will appear (*see Nodal Ring USER MANUAL*) as well as two more parameters to adjust the behavior of this automatic readjustment.

The Roll axis will not be controllable by the control desk; instead, the nodal ring will be used to perform roll movements.

Any of the previous working modes can be used as detailed before but without the crossing axis limitation:

PAN	TILT	ROLL	BPAN	RHORIZ	4AXIS
[ON]/[OFF]	[ON]/[OFF]	[ON]/[OFF]	[ON]/[OFF]	[ON]/[OFF]	[ON]/[OFF]

## 9 SPECIAL CONFIGURATIONS

### 9.1 INTERFACE WITH SCORPIO CRANES

In the Electronic Box of the Scorpio cranes there is one connector that connects the crane with the control of the Scorpio Head. By doing this the system can perform special features such as Motion Generator or Back Pan.

#### 9.1.1 SET UP CONDITIONS

BUS CONNECTIONS		
CONTROL	ver. 5.64H	EXIT
[1] PAN GYRO	6AXIS 3.66	
[2] ROLL	6AXIS 3.66	
[3] TILT GYRO	6AXIS 3.66	
[8] FOCUS SERVO	5.34 29/02/12	
[*] HAND UNIT		

09.01 Bus connection screen in SSHV

These functions are available with any regular Scorpio Head (Classic/Mini/Mini EZ or Micro) that has a SERVO F, SERVO I board (or a newer version) and a control with the CCU2000 (*Handwheels, Joystick, Pan bar...*) with a software version newer than 5.87H. The CCU2000 controls are easily identified because the control has **white screen touch panel**. To identify the SERVO versions of the HEAD it can be done by connecting the remote head to the control and opening the *MENU*→*Auxiliary*→*Bus connections*. There is a list of the SERVOs connected to the control. If the name of one of the axes is HEAD SERVO, it will not be possible to set up this function (*the board inside the head needs to be upgraded*). The stabilized heads (*Stab, Stab V*) can also use these functions only if the Stab mode is disabled.

Regarding the crane, any crane (*S10'/S17'/S23'L/S23'/S30'+7'/S38' and S45'*) can perform this feature if the electronic on the crane are updated to CCU2000 (*there is a white screen touch panel*) and the software version of the crane is newer than 5.80C.

#### 9.1.2 SET UP



09.02 Connectors to be linked.

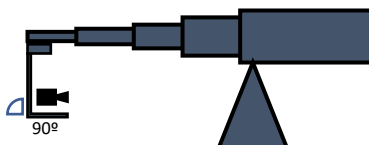
To start connecting the Head and the Crane, the control interface cable (*fig. 09.03*) can be used to send the communication line from the control interface connector from the EB to the FIZ Command connector in the back of the control of the Scorpio Head.

A standard communication cable from Servicevision (*6pin XLR*) can be used to extend the link from the control interface connector of the crane to the Control interface cable.



09.03 Control interface cable

Once the cables are connected the crane and the head can be started.

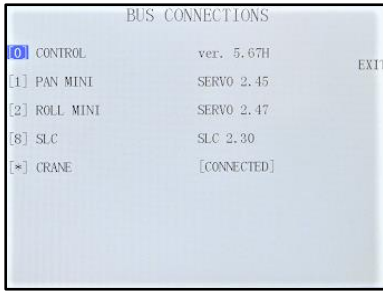


09.04 Head pointing to the crane in the horizontal position to set the ZERO POSITION

**Note: In case the user wants to use the Motion Generator mode, the ZERO POSITION of the head needs to be set with the remote head looking to the crane in the horizontal position (center the camera in the pan axis for better performance).**

**All the following functions are based on that Zero position.**

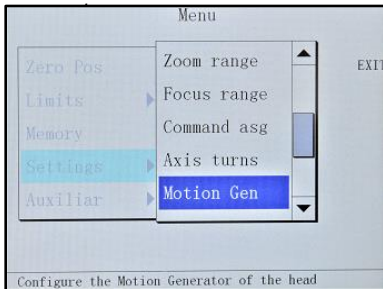
**The only function that does not require the Zero position is the Back-Pan function.**



09.05 Bus connections in head

Once the crane has been started, it has found the physical limits and the main screen in the display of the crane is shown, the communication between the crane and the head is engaged. It can be checked in the MENU→Auxiliary→Bus connections from the head control. In this screen it can be seen the [\*] CRANE identified by the head control and the status [CONNECTED].

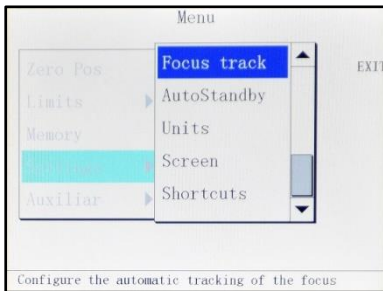
**Note: The crane needs to be engaged all the time to use the Control interface (not compatible with the standby mode).**



09.06 Motion Gen in settings

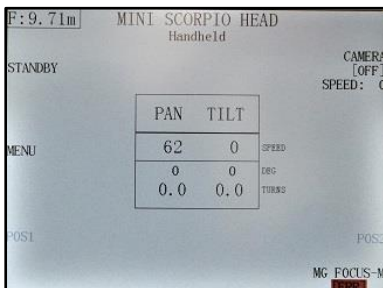
When the communication between the head and the crane is established, the Motion Gen menu is available in the MENU→Settings→Motion Gen.

The focus tracking function also appears now in MENU→ Settings→ Focus track.



09.06b Focus track in settings

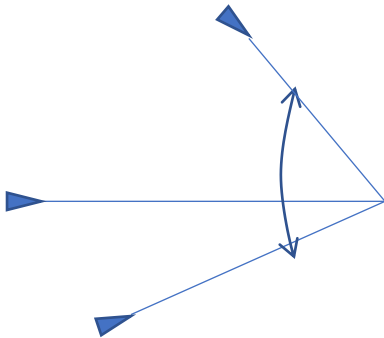
It is recommended to set a shortcut of these menus in the main screen to have a quick access in case any adjustment needs to be done. It will also warn the user in case the crane gets disconnected displaying an error message in the main screen (fig. 09.07).



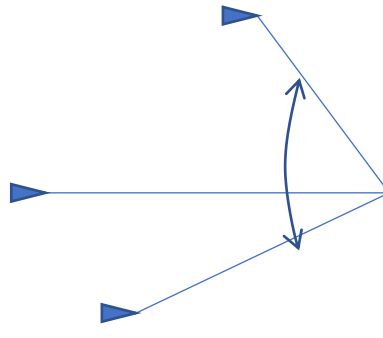
09.07 Crane not detected ERROR

### 9.1.3 BACK-PAN

In a normal operation mode, the remote head holds always the same position respect the crane. This means that if the arm of the crane swings left or right, the remote head will change the perspective of the camera by the same number of degrees that the crane in order to maintain the same position respect the crane (*fig. 09.08*).

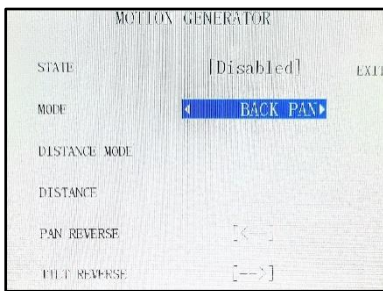


09.08 Camera point of view in different positions of the arm



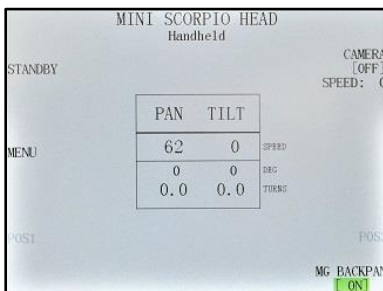
09.09 Camera point of view in different positions of the arm w/ Back-Pan ON

The Back-Pan function makes the head to hold the same infinity point even if the crane swings left or right (*fig. 09.09*). It will only work in the Pan axis to correct the swing of the crane.



09.10 Back Pan mode in Motion Gen.

To activate this function, select it in the MODE tab of the *Motion Generator* menu by pressing on the sides of the name and change the state from Disabled to Enabled by the same way.



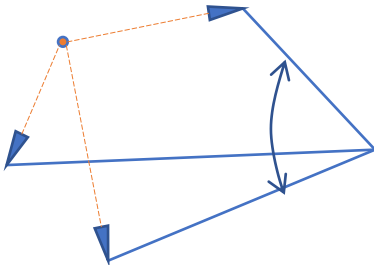
09.11 Shortcut of B. pan in main screen

In case that the remote head does not correct in the proper direction, change the tab for PAN REVERSE. This tab is to change the direction of correction depending on the model of the head or in case the head is mounted Over slung.

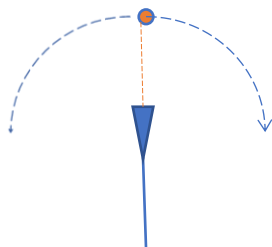
If a shortcut is created, in the main screen it will be possible to activate or deactivate it once it has been configured just by pressing on the shortcut.

### 9.1.4 TRACKING MODE

The Scorpio systems have fully encoded information regarding the position of the crane and the head in space. From a reference point called *Zero Position*, the system knows how many degrees the crane or the remote head has changed in every axis. Therefore, it's important to set the *Zero position* of the remote head and the crane always the same: with the camera facing the column of the crane in the horizontal position ([see chapter 8.1.2 Set up](#)).



09.12 Different position of the crane with the remote head tracking the same point.



09.13 Moving the tracking point when Panning on the remote head

With that information, the *Motion Generator* allows the system to generate one tracking point in the space and to keep the camera looking to that point even if the crane change the position of the camera in the space (*fig. 09.12*).

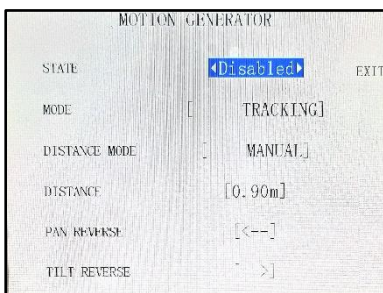
The only thing that the system needs to know is where to generate the tracking point. The way to do this is by giving to the system the distance from the center of the remote head to the point to be tracked.

**Note: This function is not a Motion Control, there are some tolerances to consider when using this function. In order to minimize these deviations, introduce the minimum distance as possible to the point to be tracked (approach the camera to the target). The minimum distance is 0.20m (7.8 inches)**

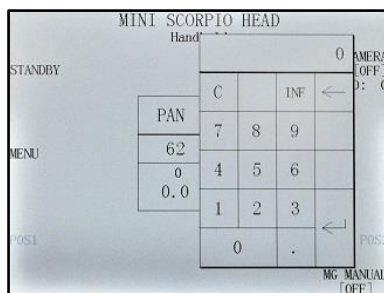
It is important to notice that there will always be possible to move the remote head from the control. The only difference is that instead of moving the axes of the head, the user will be moving the tracking point in the space depending on the distance to the tracking point. This can be used to readjust the point where the shot requires.

Depending on how the distance to the tracking point is introduced to the system, there are three different modes: *Manual*, *Focus M.*, and *Focus*. To use the *Focus M.* and the *Focus* modes a *Scorpio Focus* or a *Servo Lens Control* needs to be connected to the system, otherwise they will not be displayed.

#### MANUAL DISTANCE



09.14 Manual mode in Motion Gen.



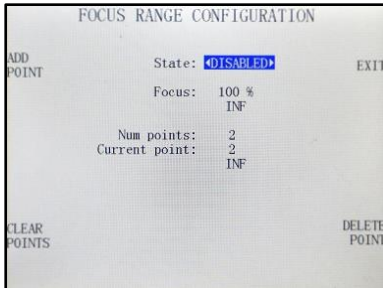
09.15 Keypad to introduce distance

When the manual mode is selected, we can introduce a distance to set the tracking point. If the number between the brackets in the DISTANCE MODE tab is pressed, a keypad will be opened to introduce the distance from where the camera is to the target. Measure this distance from the center of the head. The minimum distance is always 0.20cm (7.8 inches).

There is also the possibility to reverse the pan and the tilt in case the head is mounted over slung and the corrections in those axes are in the wrong direction. If there is a shortcut to the M.G., just by pressing the shortcut the keypad will be opened to introduce the distance.

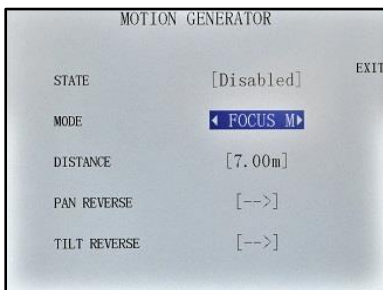
## DISTANCE BY FOCUS M

If there is a Scorpio Focus connected to the system, it is possible to introduce lens points in the system in the *MENU*→*Settings*→*Focus Range* (fig. 09.16). This is mandatory to use the Focus M or the Focus functions.

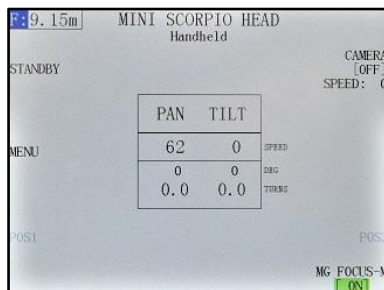


09.16 Focus Range screen

In this menu it is possible to copy the lens focal scale into the system in order to be displayed in the main screen. To do so, move the focus motor until one of the focal marks on the lens. In this mark press the ADD POINT button. A keypad will appear to introduce the focal distance mark (using the enter button). Now repeat the same process with the rest of the marks on the lens. Once all the marks are introduced and the state is ENABLED, in the main screen will be displayed the current focal length and this can be used to introduce the distance to the Motion Generator.



09.17 Focus M mode in Motion Gen.



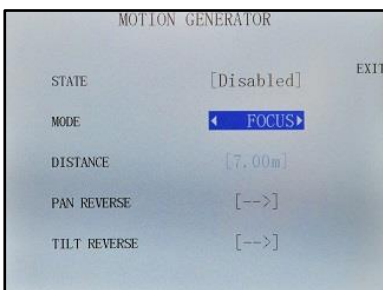
09.18 Focus M enabled main screen

When the Focus M MODE is selected, the distance of the initial tracking point will be determined by the current focal length when the system is ENABLED.

If there is a shortcut to the M.G., is possible to generate a new point at the current focal distance by pressing the blue F at the left-upper corner of the screen.

## DISTANCE BY FOCUS

To use the Focus function, a Scorpio Focus needs to be connected to the system and the focal lengths needs to be previously introduced (as in the Focus M mode).



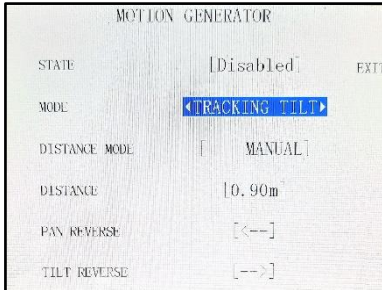
09.19 Focus mode in Motion Gen.

Once the Lens data is visible in the main screen, select the FOCUS mode in the Motion Generator menu. Now the distance of the point changes with the focal distance in real time as the focus puller moves the lens.

**Note: When using the Motion Generator, it is important to respect the same Zero position for the head and the crane ALL THE TIME. Functions as the Arc compensator needs to be used without Reset pan feature due to the Zero position of the crane will change.**

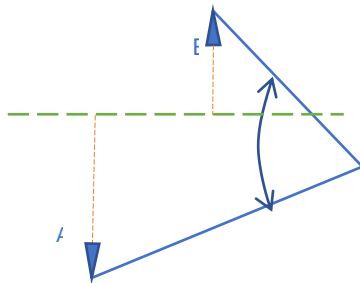
### 9.1.5 TRACKING TILT

This mode has been added in order to perform a circular movement around a line and allow the tilt axis to move upside down in one side of that line.



09.20 Tracking tilt

To use this function, point the head perpendicular to the imaginary line where you want to perform the circular movement and introduce the distance to that imaginary line using the different DISTANCE MODES seen in the previous chapter (*Manual, Focus M or Focus*). Once it is activated, any movement done by the crane will be corrected by the head to keep the camera pointing to that imaginary line. If the crane is moved to the opposite side of the line, the camera will be facing upside down.



09.21 Different position of the crane with the remote head tracking the same line.

A – Camera facing the line

B – Camera facing the line upside down

C – Imaginary line

D – Distance to the imaginary line

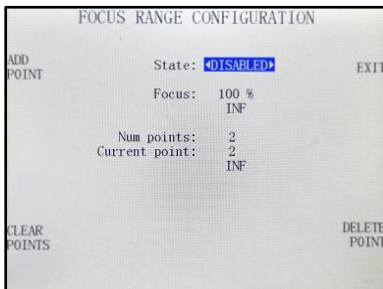
As seen in the diagram, the camera starts in the position A and the distance from the point A to the imaginary line is introduced into the system. Once it is activated, the system will recalculate the distance to the imaginary line in any position of the crane and, in case the crane moves to the other side of the imaginary line (*point B*), it will be facing that line in the upside-down position.

This mode can be used together with the arc compensation feature of the crane to perform a perpendicular movement of the crane respect the imaginary line and track the same point of that line.

**Note: All the restrictions applied to the tracking mode, also applies in the tracking tilt mode, such as respect the Zero position of the head and the crane all the time that the function is enabled or the minimal distance to the line of 0.20cm (7.8inches).**

### 9.1.6 FOCUS TRACKING

The focus tracking is a function that keeps the focal distance at the same point regardless the movement of the crane. The different modes are *TRACK CRANE*, *CINETAPE* and *CINETAPE M*.

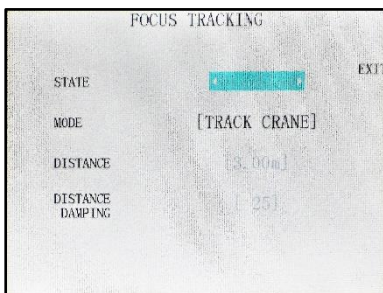


09.16b Focus Range screen

To use any of these functions a Scorpio Focus must be connected to the system by wire and the lens marks must be pre-introduced into the system. To introduce the lens points into the control for the head go to *MENU*→*Settings*→*Focus Range* (fig. 09.16b). Move the focus motor until one of the focal marks on the lens. In this mark press the ADD POINT button. A keypad will appear to introduce the focal distance mark (using the enter button). Now repeat the same process with the rest of the marks on the lens. Once all the marks are introduced and the state is ENABLED, in the main screen will be displayed the current focal length on the top left corner.

**Note: The focus puller can always override any of these functions to readjust the focal distance to the target. The minimal focal distance to track is 0.50m (19 inches).**

### TRACK CRANE

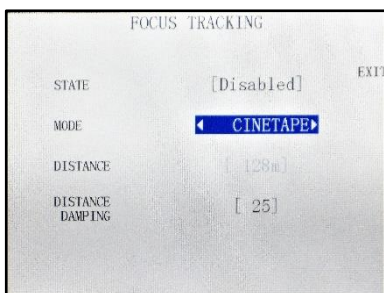


09.22 Track crane menu

The track crane requires the motion generator feature to be enabled only in the manual distance mode ([chapter 8.1.3](#)).

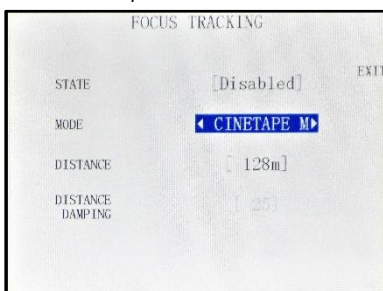
Once the motion generator is enabled and the point has been generated, it is possible to enable the track crane and the focal distance will be automatically adjusted to the same tracking point of the crane.

### CINETAPE & CINETAPE M



09.23 Cinetape mode

The Cinetape and the Cinetape M modes require to have a cinetape connected to the Scorpio Focus. When the CINETAPE mode is ENABLED, this mode will use the current distance reading of the cinetape to set the focal distance at that distance all the time. Since the reading of the cinetape can vary in high values depending on the proximity of the objects, there is the possibility to add damping to the movement of the focus motor in this screen.



09.24 Cinetape M mode

The Cinetape M mode will use the distance reading of the cinetape to set the point ONLY when it is enabled. If the distance reading changes after the mode has been enabled, the system will not change the focal distance to the new reading.

**Note: The focus tracking functions are only available with software version newer than 5.87H for the HEAD CONTROL and newer than 5.80C for CRANE**

## 9.2 RECORD MEMORIES CRANE-HEAD

There is an accessory to synchronize the memories of the crane and the head in order to start them at the exact same time.



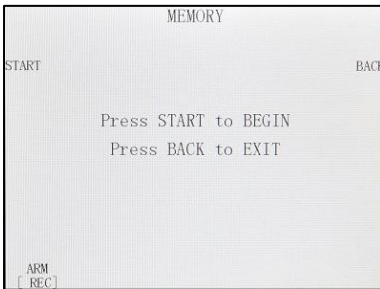
09.27 Analog & Digital Hand command

To use this device, it is mandatory to know if the crane has been updated with a digital hand command. It is easy to identify it because the digital hand command is labeled as *digital hand command* and it has an LED on it and three buttons.

Depending on which hand command the crane has, the trigger for the memories will be analogic or digital.

The control for the Scorpio Head does not need to be updated, just take in consideration that the trigger will be connected in the connector for the *JDR Roll*.

### 9.2.1 SET UP CONDITIONS



09.28 Start recording screen

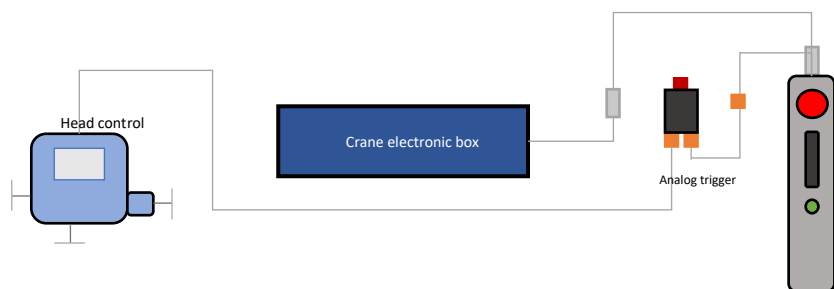
The first thing to do is connect the memory trigger as shown on the respective diagrams depending on if the hand command is analog or digital.

Both controls (*crane & head control*) must have a screen display connected in order to have access to the memory menu. Once the axes to be recorded are set, press the *STARTUP* button on the screen and the *fig. 09.28* will be displayed. Ensure that both controls have this screen displayed before pressing the start button.

### 9.2.2 ANALOG TRIGGER



09.29 Analog trigger memory (Ref. 1213)



09.30 Adaptor for analog trigger (Ref. 7082)

To start the memories of the head and the crane at the same time with the analog hand command, the adaptor cable (*Ref. 7082*) needs to be connected to the hand command. The 7pin female goes to the hand command, the male can be extended with regular hand command cables to the electronic box of the crane. The Lemo 6 pin female needs to be extended with a male-to-male cable (*Fig. 09.31*) into the analog trigger box. From the trigger box, another male-to-male Lemo cable needs to be connected into the head control in the *JDR Roll* connector in the back of the control.

With everything connected and the [8.3.1 Set up conditions](#) fulfilled, press the red button of the trigger and both memories will start at the same time.



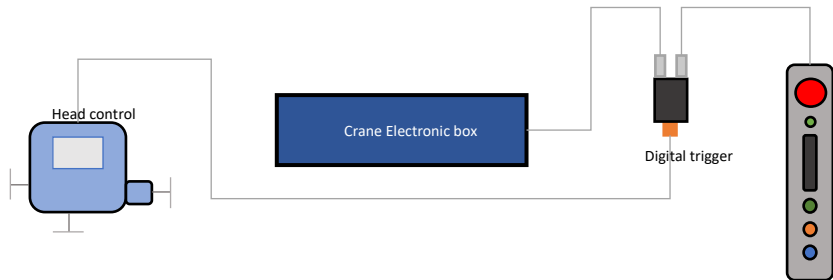
09.31 Lemo 6pin male to male cable

To play them back at the same time, use the same procedure but instead of REC in the memory menu, set the axes in PLAY.

### 9.2.3 DIGITAL TRIGGER



09.32 Digital trigger memory (Ref. 7114)



To start the memories with the digital trigger memory the hand command needs to be connected to the trigger with a regular hand command cable. From the 7pin male panel connector of the digital trigger memory another regular hand command cable needs to be connected to the crane electronic box. The Lemo 6 pin female from the trigger box needs to be connected to the *JDR Roll* connector in the back of the control with an extension cable (*fig. 09.31*).



09.33 Digital trigger memory 7pin connectors side

With everything connected and the [8.3.1 Set up conditions](#) fulfilled, press the green button of the hand command and both memories will start at the same time. To play them back at the same time, use the same procedure but instead of REC in the memory menu, set the axes in PLAY.

## 10 DOCUMENTATION

### 10.1 PINOUTS

#### Connectors from the head:

Camera power connector (SOURIAU 4Pin Female Panel UT00104SH)

A 12V  
B GND  
C 12V  
D GND

Data connector (LEMO 4 pin female panel EGG - 1B.304.CYM)

1 Rx+  
2 Rx-  
3 Tx-  
4 Tx+

Scorpio Focus connector (LEMO 5 pin female panel EGG -1B.305.CYM)

1 24 Vdc.  
2 GND.  
3 485 P.  
4 485 N.  
5 NC

Continuous Roll connector (LEM 10 pin female EGG – 2B.310.CYM)

1 30 VDC  
2 30 VDC  
3 30 VDC  
4 GND  
5 GND  
6 GND  
7 NC  
8 CAN H  
9 CAN L  
10 Shield CAN

#### Common connectors on the controls:

VDC 24/30V (Neutrick 3 pin male)

1 30 VDC IN  
2 GND  
3 NC

FIZ Command (Lemo 7pin female EGG - 1B.307)

1 30Vdc  
2 GND  
3 485P  
4 485N  
5 NC  
6 NC  
7 NC

12V/3A (Neutrick 4 pin female)

1 GND  
2 NC  
3 NC  
4 12Vdc OUT

JDR ROLL (Lemo 6pin female EGG -1B.306)

1 5Vdc  
2 GND  
3 ROLL POT Signal  
4 ROLL ROCKER Signal  
5 Presence detector  
6 Button

Head command (Neutrick 6 pin female)

1 NC  
2 GND  
3 NC  
4 30Vdc OUT  
5 485B Grey  
6 485A Pink

JDR ZOOM (Lemo 6pin female EGG -1B.306)

1 5Vdc  
2 GND  
3 ZOOM POT Signal  
4 ZOOM ROCKER Signal  
5 Presence detector  
6 Button

ROLL HW (Lemo 8pin female EGG -1B.308)

1 5Vdc.  
2 GND  
3 ENC A+  
4 ENC A-  
5 ENC B+  
6 ENC B-  
7 NC  
8 Presence detector

PEDAL (Lemo 6pin female EGG -1B.306)

1 5Vdc  
2 GND  
3 PEDAL POT Signal  
4 PEDAL ROCKER Signal  
5 Presence detector  
6 Button

## 10.2 ENCODER OUTPUT RESOLUTION

The 4 pin Lemo connector can be used to collect data from the head. The protocol used to send data is 485 full duplex at 115000 bit/s.

The pinout of the data connector is the next one:

1 Rx+                      2 Rx-                      3 Tx-                      4 Tx+

The method of transmission is U8N1 (*8bits without parity and 1 stop bit*) and the order of the bytes is the next one:

0xFF [ <i>sync byte 0</i> ]
0xA5 [ <i>sync byte 1</i> ]
0x01 [ <i>sync byte 2</i> ]
<i>Data size [n]</i>
...
...
...
<i>[n]</i>
CHECKSUM

The CHECKSUM does not count the sync bytes, only the data and the data size.

The data sent will be the encoder points from the axes and the size depends on the number of axis connected. The format of the data will be the next one:

0x14 ( <i>'E' in hex.</i> )
<i>Byte [3] enc. Pan</i>
<i>Byte [2] enc. Pan</i>
<i>Byte [1] enc. Pan</i>
<i>Byte [0] enc. Pan</i>
<i>Byte [3] enc. Tilt</i>
<i>Byte [2] enc. Tilt</i>
<i>Byte [1] enc. Tilt</i>
<i>Byte [0] enc. Tilt</i>
<i>Byte [3] enc. Roll</i>
<i>Byte [2] enc. Roll</i>
<i>Byte [1] enc. Roll</i>
<i>Byte [0] enc. Roll</i>
... [ <i>Roll Ring</i> ]

The encoders resolution for each axis is  $2^{20}$  **points** or **1.048.576 points (2912,7111 points/deg.)**

## 10.3 OTHER DOCUMENTATION

**CCU C2000 BOARD DIP CONFIGURATION**

SAD1

SWITCH	1	2	3	4	5	6	7	8
JOYSTICK 2.I	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
JOYSTICK 2	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
JOYSTICK 4.I	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
JOYSTICK 4.F	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
JOYSTICK 5.FL2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
HANDWHEELS	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
HANDWHEELS EZ	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
JDR	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
HANDHELD	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
CRANE(23,30,45)	OFF	OFF	ON	OFF	OFF	BOX	MOT	ENC
CRANE 10'	OFF	ON	OFF	ON	OFF	BOX	OFF	OFF
CRANE 17'-23'	OFF	OFF	ON	ON	OFF	BOX	OFF	OFF

- SCORPIO CRANE:

→ **SWITCH 8** – ENCODER TYPE (*ENC*)

OFF: ENCODER E2

ON: ENCODER E1

→ **SWITCH 7** – MOTOR TYPE (*MOT*)

	SCORPIO 30	SCORPIO 45
OFF	MOTOR MINI (HI-SPEED)	MOTOR 1
ON	MOTOR NORMAL	MOTOR 2

→ **SWITCH 6** – ELECTRONIC BOX TYPE (*BOX*)

	SCORPIO 45	SCORPIO 10
OFF	BOX STANDARD	V1
ON	BOX 4K (HI-SPEED)	V2

BOOT

SWITCH	1	2	3	4	5	6
	ON	ON	ON	ON	OFF	ON

\*DIP switch configuration at date 05/11/2020

Service vision keeps the right to change or modify any specifications of the head without being specified in this manual.