Servicevision Bis S.L.

Scorpio Stabilized V

User's manual v1.02

0 INDEX

1 TECHNICAL INFORMATION

1.1 BASIC INFORMATION

The Scorpio Stabilized V Head is a remote robotic system designed for filming movie shots in hard conditions. It is possible to attach different kind of cameras and lenses to the system and the remotely control the movement of the camera while, at the same time, the remote head stabilizes any vibration arriving to the camera.

The Scorpio Stabilized V Head can be used with any Servicevision remote control: Handwheels, joystick, pan bar… it is fully compatible with all the touchscreen controls used for other Scorpio heads. To control the lens, any lens control from Servicevision can be integrated to the system.

The Scorpio Stabilized V Head is made by a combination of aluminum and carbon fiber and it is designed to be water resistant in most of its parts. The head is moved by 5 motors with different gears and transmission systems including magnetic motors without any mechanic components between their parts making the motor more efficient.

The main differences with the previous Scorpio Stabilized Head are the speed (*now is possible to turn 360º in the PAN axis in 2.5 sec*.), the reduced drift in all the axes and a major improvement on the level of stabilization.

Servicevision has developed a new generation of PCB boards that allows the system to detect a bigger range of vibration frequencies and make corrections to those vibrations at speeds up to 200.000 corrections/sec.

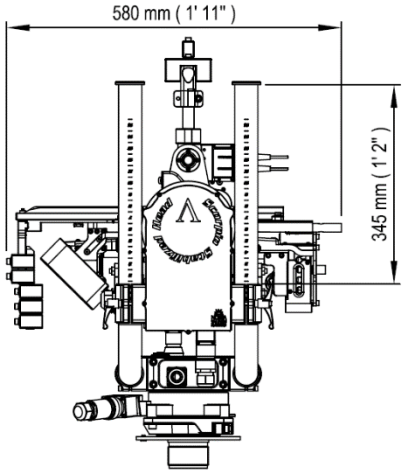
The power requirements for the Scorpio Stabilized V Head are the same than the previous version. It can be powered with Servicevision power units or by batteries and, at the same time, power directly any camera from the Scorpio Stabilized V without the need of an external battery for the camera.

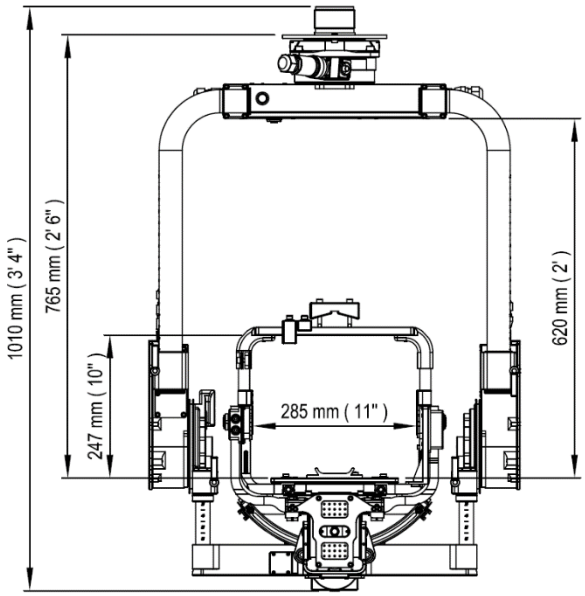
The design of the new Scorpio Stabilized V Head is more user friendly; it is easier and faster to adjust the size of the head to different camera packages thanks to the sliding carbon fiber bars.

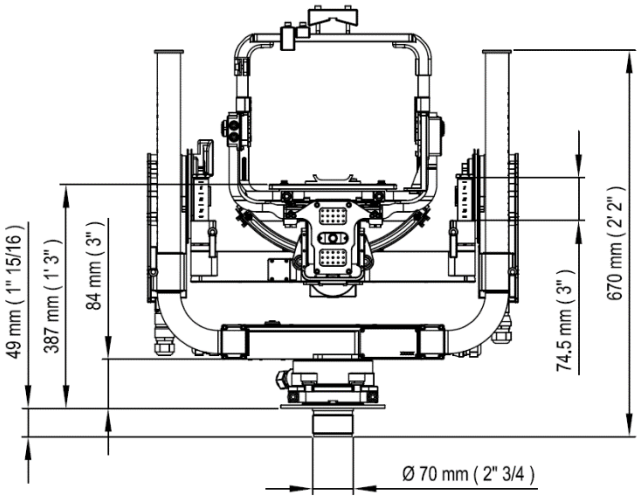
Also, the possibility to detach the Mitchel mount from the head and the different mounts provided with the Scorpio Stabilized V, makes it easier to use it in different supports such as cranes, camera cars, dollies or any special rig that demands a stabilized head.

1.2 TECHNICAL SPECIFICATIONS

Max. Payload:	*45kg (99,2lbs)*
Weight of the Head:	*38kg (83lbs)*
Max. height (from the mount):	*961mm (37,8in)*
Max width:	*640mm(25,2in)*
Max. Speed:	*2,5sec per turn.*
Rotation for Pan, Tilt & Roll:	*360º for Pan (unlimited turns)* *270º for Tilt* *+/-30º for Roll*
Power output for camera:	*12V 400W* *24V 400W*
Video output:	*1 HD slipring for pan axis* *1HD slipring for pan axis (camera side)*
Power requirements:	*30V (28V-32,5V)* *800mA standby consumption* *10A max consumption (only head)* *20A required to power camera and head*
Controlled by:	*Cable up to 500m (1500ft)* *Scorpio Radio*



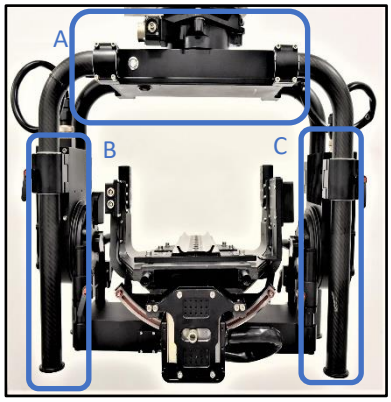




2 PARTS AND COMPONENTS

2.1 STABILIZED V GENERAL VIEW

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



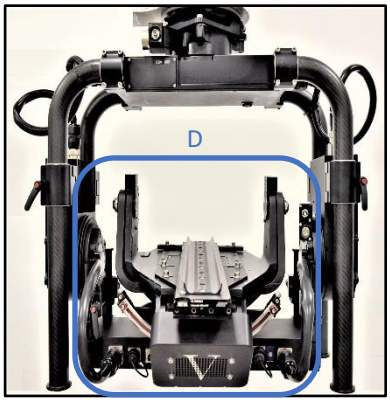
02.01 Frontal view.

A. *Follower Pan Axis Module:* Inside this axis it is located the follower motor and the driver board to control that motor.

B. *Follower Master Tilt Module:* In this axis there is located the follower motor and the driver board to control that motor.

C. *Follower Slave Tilt Module:* In this axis there are located the down converters to power different kind of cameras.

These followers are assembled together with the carbon fiber bars and they can only be connected in one position.

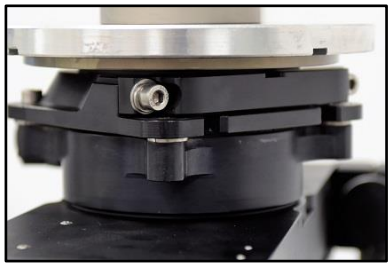


02.02 Rear view.

D. *The Dog:* This part includes the magnetic motors (*or inner axes*) and the roll axis. The main servo board for the head is located in this part.

2.2 FOLLOWER PAN AXIS MODULE

The follower Pan axis module has two parts: the fix part, attached to the support, and the mobile part that spins the pan axis. It works with the magnetic pan motor from *the Dog* to stabilize the image and move the camera in the panoramic axis.



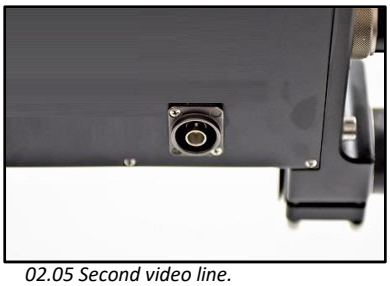
02.03 Lock for the sliding dovetail.

The fix part of the head has a sliding dovetail that slides in the two different supports from the accessories box. This dovetail has a lock bar (*Ref.3507)* with two screws (*M8 35.3001.25)*. This lock needs to be removed to mount the head in the Mitchell mount adaptors.

Between the fix part and the mobile one there are sliprings to pass the signals and the power through the axis allowing the head to turn as many times as needed in the pan axis without any risk to damage the cables.

02.04 Connectors from the fix part.

The Multicore connector on the fix part (*fig. 02.04*) is the main connector for the head. It is located in the fix part of the follower pan axis. Through this connector power and communication signals are sent to all the head parts and the HD video signal and the Auxiliary



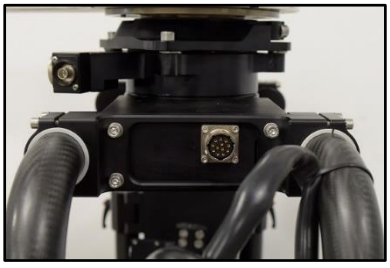
02.05 Second video line.

line coming from the camera can be sent back to the monitors and RCUs. When connecting the multicore cable, align the male with the female, introduce the cable and twist it until is locked.

There is a second BNC Line Output to pass an HD video signal output from the camera though the follower pan axis module (*fig. 02.05*).

02.06 Master tilt connector.

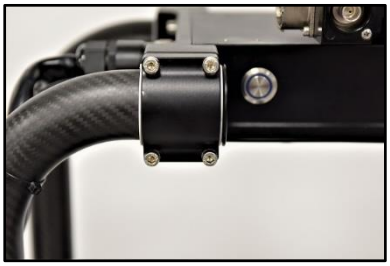
In both sides of the follower pan there are cables connecting to the Master Tilt and Slave Tilt axes. The master tilt side can be identified because the HD signal passes through this connector (*fig.02.06)*. When connecting the cable, align the male with the female, introduce and twist until is locked. There is only one way to connect these cables (*there is no possibility to connect the master cable in the slave axis since the connectors are different*).



02.07 Slave tilt connector.

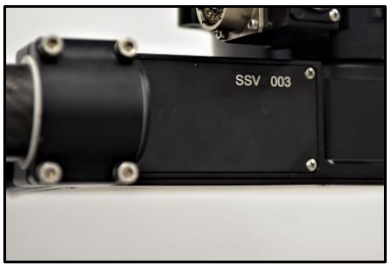
> ***Note: all the cables and connectors from the follower pan axis are water resistant. Ensure that all the connectors are locked before starting the head.***

The Standby button, located in the movable part of the follower pan axis, 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.



02.08 Standby button

Each carbon fiber bar is tight with 4 screws (*M5x25 DIN 912)* on the bracers (*fig.02.08-02.09)*. They only need to be loosened to remove the belt on the master tilt axis or to align the carbon fiber bars (*see chapter 6.2 maintenances*).



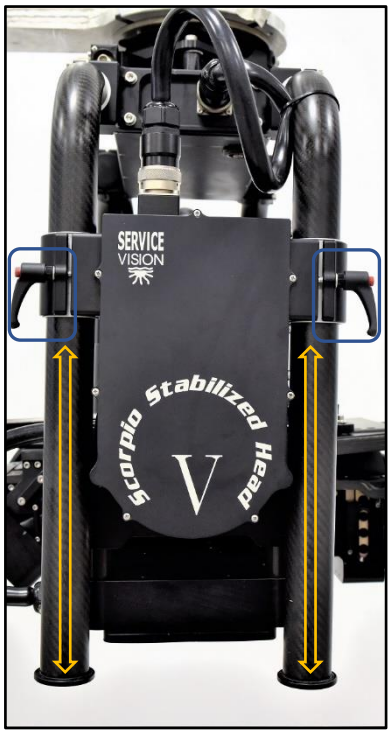
02.09 Pan motor cover

Inside the follower pan axis there is the motor and the driver (*amplifier*) board to control this axis. The motor transmits the movement to the main pan gear if the axis using a belt attached to an endless screw. This belt acts as a mechanical fuse: in case something gets stuck in the pan movement of the head, it will be the first thing to break. There is a cover (*fig. 02.09*) to have access to this belt in case it needs to be replaced (*see chapter 6.2 maintenances*).

- Commercial reference for the follower pan belt: T2,5 x 177,5

2.3 TILT MODULES

The master tilt module turns *the dog* up and down up to 270º of total range using one motor located in the master tilt. It has mechanical limits inside to stop the tilt movement of the camera before it reaches the following pan. The slave tilt module has bearings inside to support the weight of *the dog* but it has no motor in it. Inside the slave axis there are the down converters to power different kind of cameras at 12 or 24 volts.



02.10 Tilt axis.
A- Knobs to lock the tilt axis.

The tilt axes are attached to the follower pan with the carbon fiber bars. To slide the tilt axes though the bars, release the knobs of both axes (*A in fig.02.10)* and push up or down on both tilt sides equally. Tight them again in the desired position.

> ***Note: to ensure that the axes slide properly, push both sides at the same time and at the same speed.***
>
> ***Before tight them, ensure visually that both tilts are at the same level.***

On top of each axis there is a connector for the cable to link the axis into the follower pan. These cables need to be connected all the time and also have a grade of protection against water.

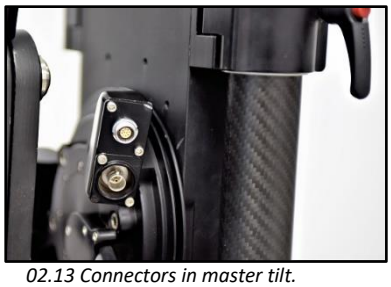
02.11 Cables disconnected from the dog.

To remove the tilt axes from the pan, loose completely the knobs of the axes and the bracer that holds the module can be opened. Moving slightly the carbon fiber bars it is possible to pull both sides and *the Dog* from the follower pan axis.

To remove the tilt axes from the dog it is necessary to disconnect the cables that connect the tilt with *the Dog (*fig.02.11). Remove the safety cap from the dog bars, loose the knobs from the dog bars and then pull from it until the bars detach from the tilts.

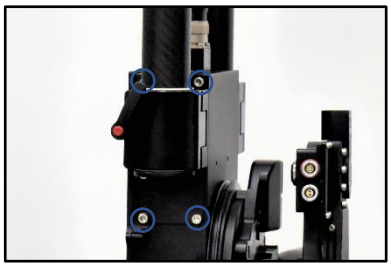
02.12 Heat diffuser in tilt slave.

To identify the slave or the master tilt easily, notice that the slave tilt has a heat diffusor to cool the voltage regulators for the cameras (*fig.02.12)*. The master tilt has the main BNC HD line and an auxiliary connector (*fig.02.13)* which allows 10 data lines to pass through the sliprings in the pan axis and reach the camera for different purposes.



02.13 Connectors in master tilt.

> ***Note: the pinouts of the connectors are in the Documentation chapter.***



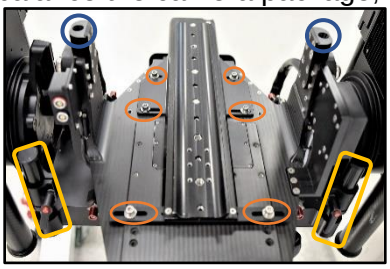
02.14 Motor cover.

The motor inside the master tilt side transmits the movement to the main gear of the tilt using a belt. There is a cover in the master tilt side (*fig. 02.14*) to have access to the belt in the tilt in case it needs to be replaced. This belt acts as a mechanical fuse as the one in the pan. To see how to change the belt see the *chapter maintenances*.

- Commercial reference for the follower tilt axis: T2,5 x 177,5

2.4 THE DOG

The dog is the part of the head where the camera is mounted. It has sliding bars on the sides to balance the camera package, the magnetic motors, and the roll axis.

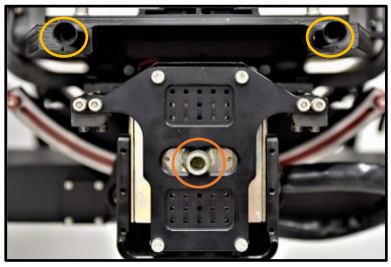


02.15 Top view of the dog.
A- Sliding bars to balance the Dog.
B- Threads for upper bridge bars.
C- Position threads for plate support.

It has four bars tight with knobs (*A in fig.02.15)*. These sliding bars connect the Dog with the follower tilts. They have a cap stopper at the end to prevent it to fall in case all the knobs are released.

On top of the sides of the inner axes there are two threads to mount the upper bridge bars (*B in fig.02.15)*.

The dog has 3 different positions to mount the base plate inside the inner axes. The base plate has sliding slots to relocate it in any of these three positions in order to balance the roll (*C in fig.02.15)*.



02.16 Inner pan axis motor front view.
A- Front support bars for lens locking.
B- Stopper for inner pan axis.

The magnetic motors on the dog are the main motors for the head. They are also called Inner motors (*or inner axes*) in this manual. The function of these motors is to stabilize the vibrations and move the head in space. They have a limited range of movement by the stopper for the pan axis and the stoppers in the tilt axis at the back. The pan motor stopper (*B in fig. 02.16*) is also used to lock both magnetic axes to operate the head without stabilizing (*see chapter Special configurations*). The front bracket bars are located in front of the inner axes (*A in fig. 02.16*). They are used to mount the bracket system that will lock the camera to the remote head.

02.17 Bottom view of the rolls belt.

The roll axis moves the inner axes in the space. To move the roll there is a motor connected to the roll rails by the rails belt (*fig.02.17)*. This belt secures its position. To tight it, in the ends of the belt there are the roll tensor systems. The process to change this belt is described in the *chapter maintenances*. There is an internal roll belt to link the motor with the reduction gear. It is also described how to replace it in the *chapter maintenances.*

- Commercial reference for the Roll belt: T2,5 x 950
- Commercial reference for the internal Roll belt: T2,5 x 230

At the end of the roll range there are the stoppers. They mark the limit of the roll axis when the system calibrates.

02.18 Connectors on inner tilt.

At one side of the inner tilt axis there are two connectors (*fig.02.18)*: The FIZ command (*This connector provides power and extends the communication line to the Scorpio Focus*), and the Witness camera (*connector that gives a 12V 2A output normally used for witness cameras, but it can be used as needed*).

02.19 Left side connectors in the dog.

On both sides of *the dog* there are connectors to communicate the dog with the tilt axes. These connectors need to be aligned between male-female, introduce the male and twist until they are locked. There are three more connectors without counting the tilt connectors: (*from left to right*) continuous roll, camera power output and encoder data output.

The continuous roll connector provides power and communication for the Nodal Roll accessory. In the *special configurations chapter*, there is an explanation about how to mount it into the head.

02.20 Right side connectors in the dog.

The power camera output provides power for different kind of cameras. Every camera cable provided with the head is wired according each camera specifications.

The encoder data output gives information for every axis of movement.

Note: the pinouts of the connectors and the information about encoder ratios are in the Documentation chapter.

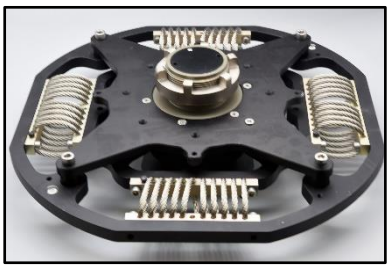
There is an LED in the right side of *the dog*. This LED marks the status of the digital board inside the Scorpio V according to the next color code:

LED Indicator	Status of the Head
OFF	Digital board without power.
FIXED RED	Without communication with the CCU *(control desk).*
FIXED GREEN	Motors engaged; head ready to use.
FLASH RED/GREEN	Standby button in the head pressed / Communication cable disconnected.
FIXED ORANGE	Standby mode enabled from the CCU (*control desk).*

Note: Do not manipulate the camera package without pressing the Standby button if the LED is fix green.

2.5 ACCESSORIES & CABLES

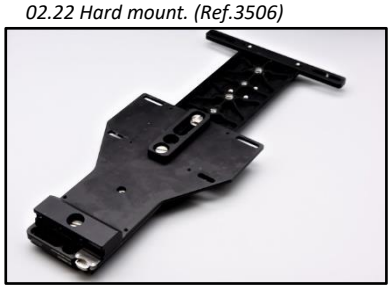
The Scorpio Stabilized V Head is provided with different cables and accessories. In this chapter there will be a brief description of each accessory and cable provided with the head.



02.21 Isolator damper. (Ref.3505)

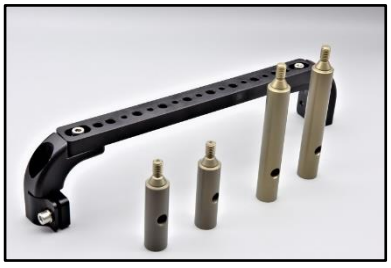
02.22 Hard mount. (Ref.3506)

02.23 Base plate upper view. (Ref.3515)

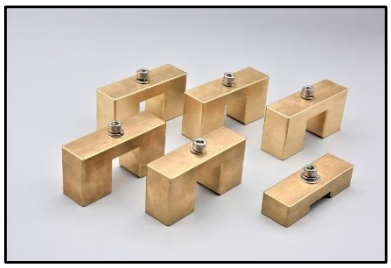


02.24 Base plate bottom view.

02.25 Rear CW support. (Ref.3508-3509)



02.26 Upper bridge for CW. (Ref.3514)



02.27 Set of counterweights. (Ref.3510)

02.28 Set of brackets and bars.

02.29 Spare belts and screws.

02.30 Set of tools.

There are two kind of Mitchell mounts where the Scorpio V can be mounted depending on which situation the head performs: The iso damper, for heavy duty situations (*Scorpio Arm, camera cars, cable cams*) and the hard mount, designed for telescopic cranes, fixed cranes, and dollies.

The sliding base plate allows the user to mount the camera from both sides. It has sliding slots to move it sideways when is attached to *the dog*. It is important to notice that it has three screws under it (*fig. 02.24*), linking the sliding plate with the adaptor. These screws need to be tightened before mounting it. It also has place to hold the attachment screws when is not assembled.

The upper bridge and the rear CW support (*fig.02.25-02.26)* can be used to balance any kind of camera package. The upper bridge is threaded with M5 threads for the CW and 3/8 threads for different camera accessories. The upper bridge has to be mounted always in order to give rigidity to the fiber mount.

The counterweights, provided with the equipment, can be attached to the upper bridge in different positions or the rear CW support.

In the accessories case there must always be a set of spare screws, set of tools and a set of brackets in order to properly attach the camera package to the head and belts to be able to change any mechanical fuse in the head.

02.31 Power Unit. (Ref. 1303)

The P.U. is a 30v 20Amp power supply. It has a 20Amp fuse in front and a 7Amp fuse in the back part. It is powered from AC current and has two 3pin XLR outputs for the remote head.

02.32 Main cable for the SSV. (Ref. 3502)

There are two kind of adaptors for the Scorpio Stabilized V Head: one long and one short. These adaptors are water resistant on the SSV side and on the other side they have 5 connectors: two 3pin XLR for power, one 6pin XLR for communication with the control, 1 BNC for the video signal and a 10pin *Lemo* connector to be used as an auxiliary 10 data lines to pass through the sliprings of the head.

02.33 Power cable. (Ref. 1112)

02.34 Communication cable. (Ref. 1103)

There are extension cords for the communication and the power. The communication line can be extended several times by joining cables together. The power cable cannot be extended like that due to the voltage drop of the line.

02.35 Main tilt spare cable. (Ref. 3503)

02.36 Slave tilt cable. (Ref. 3504)

There are spare cables for both tilts in case one of them breaks. To connect these cables, align the marks of the female with the male and twist the connector clockwise until the click.

02.37 Amira power cable. (Ref. 2046)

02.38 Alexa power cable. (Ref. 2015)

Depending on which camera is going to be attached to the head, Servicevision provides different cables to power a range of cameras from 12v to 24v.

Note: the pinouts of the cables are in the Documentation chapter.

2.6 HEAD CONTROLS

All the controls from Servicevision are compatible with the Scorpio Stab V. They need to be upgraded to the white screen display and with a software newer than 5.51H.

02.39 Handwheels control.

02.40 Pan Bar control. (JDR)

02.41 Joystick control.

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

02.42 Frontal display.

02.43 Rear panel from HW.

In the frontal part of each control there is the display. This is a touch panel to interact with the system (*see chapter 4 for control display information*). There are also three potentiometers. These potentiometers (*or knobs*) adjust the speed of every axis of the head independently. 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 in the screen*). If it is pressed a second time, it will change the direction of movement of the axis.

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 with the *Scorpio Cranes.*

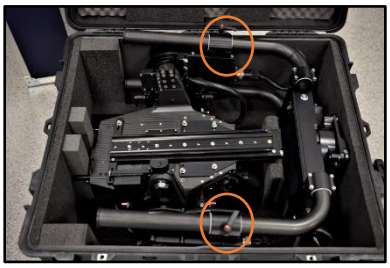
>JDR ZOOM /JDR ROLL /PEDAL / ROLL HANDWHEEL: These connectors are for different peripherals for the system. To control different axes (Roll, Zoom, Iris, Focus…) from different kind of controls. There is more information about the assignment of these peripherals in the *chapter 4.5.6 Command assignment*.

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

3 SET UP THE EQUIPMENT

3.1 MOUNTING THE REMOTE HEAD

The Scorpio Stabilized Head V is stored inside the box with all the knobs loose. The only knobs tight are the 2 that remain on top of the head when stored (*marked in fig.03.01*). To take it out of the box, loose those 2 knobs and pull gently from the sidebars to have access to the two screws on the dove tail (*M8 35.3001.25)* lock bar on top of the head to remove it.



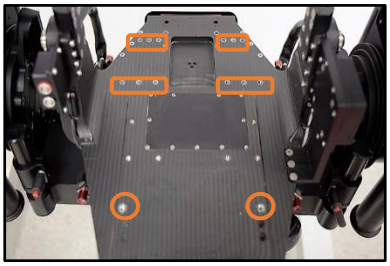
03.01 Stab V inside the box.

The Scorpio V head comes with 2 kind of Mitchel mount to dove tail adaptors: one hard mounted and one with suspension springs. To mount any of the Mitchel mount adaptors, screw them into the support with the Keyway aligned and tight firmly the nut to lock them on place using the Mitchell mount tool.

03.02 Sliding part of the Dove tail.

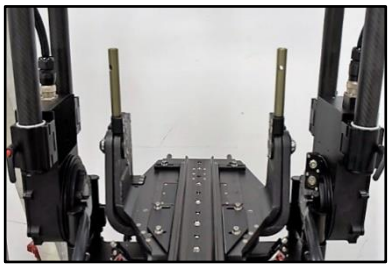
The Mitchel mounts have one side thinner *(marked with a dot)*. This will be the side to introduce the Scorpio V head into the mount and then lock it with the screws from the Dove Tail's locking bar.

Once the head is mounted, mount the base plate for the camera in the magnetic axis. To do this, use the six screws (*M6 35.3018.19)* to attach the base plate in one of the 3 positions. If the configuration of the camera package is too heavy in one side, the base plate can be mounted sideways to keep the balance of the camera package as centered as possible.



03.03 Slots for attaching the sliding plate.

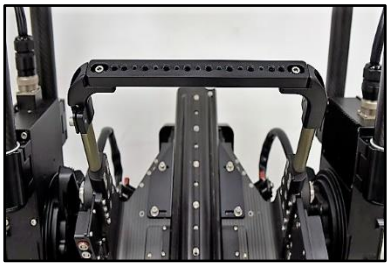
> ***Note: Before mounting the base plate, certify that the adaptor for the base plate is tight with the 3 camera platform screws (fig. 02.24).***



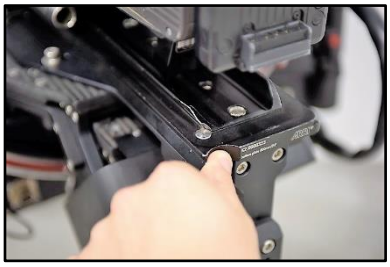
03.04 Bars assembled for upper bridge.

With the base plate secured into the head, proceed to mount the upper bridge. To do this, attach the 110mm or the 60mm upper bridge bars (*or both together if needed)* to their threads on both sides of the magnetic platform and mount the upper bridge between them tighten all the screws (*fig.03.04-03.05)*.

Ensure to leave enough room inside to be able to slide the camera package front and back.

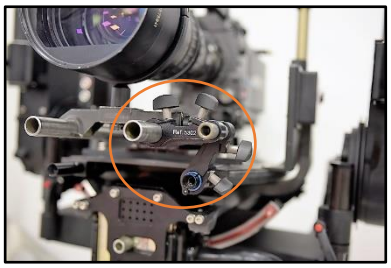


03.05 Upper bridge assembled.



03.06 Safety pressed to slide the camera in.

Once the bridge is assembled, slide the camera package into the sliding plate by pressing the safety stop. Then lock the sliding platform from the camera in a position where the inner tilt axis does not move.



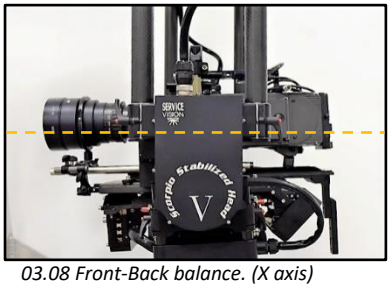
03.07 Safety lock attached.

Mount both frontal safety locks using the brackets and the bars from the accessories box as shown in *fig. 03.07*. Attach both safety locks into the camera rods using the bushings in case it is needed. Be sure to do not attach them into the stopper for inner axis.

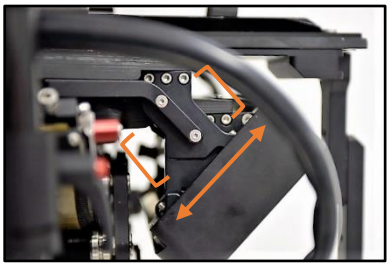
Leave the side of the camera rods loose in order to balance the camera package front or back.

3.2 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.

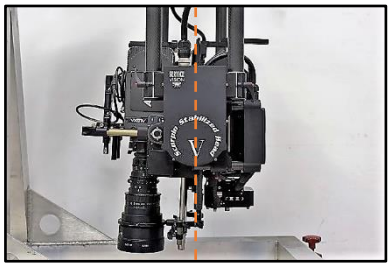


03.08 Front-Back balance. (X axis)



03.09 Magnetic tilt range.

Start to balance it with the camera pointing straight front (*fig.03.08*) and slide the camera package front and back along the base plate until it stays in the middle of the floating range of the tilt magnetic motor (*fig. 03.09*). To move the camera front-back, loose the front safety locks and the sliding lock.



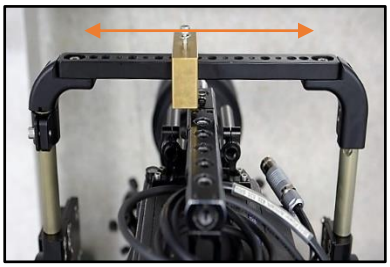
03.10 Top-Bottom balance. (Y axis)

Once the X axis is balanced, point the camera package straight down (*or straight up in case the head is mounted over slung*) to do the balance in the Y axis (*fig.03.10*). In this position, we are checking the top/bottom weight relation.

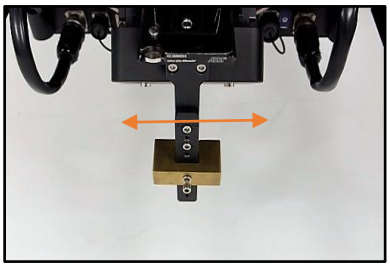
Note: To do the top/bottom balance, slightly balance the following tilt using the sliding bars from the Dog up or down.

In case the camera package is bottom heavier, add weights on the upper bridge (*as many as needed to keep the magnetic tilt in the middle of its range on the position seen in fig.03.10*). In case the camera package is already top heavier, we will mount the back-counterweight support ("T") in order to add weight on the bottom part of the camera package (fig.03.12). The extension for the back counterweights support can be used in order to mount more weights if needed.

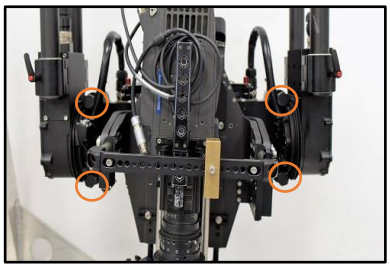
The balance for the Z axis (*left/right masses*) needs to be done in the straight down position (*the same as we used to do the Y axis*). In this position, move the magnetic pan motor to the left and to the right to see its behavior. On both sides, the camera package should behave the same, either come back to the center of the axis or remain supported in the magnetic pan motor limit. If they are not, move the weighs on the upper bridge or move the rear counterweight support along the Z axis to have the same amount of displacement on both sides.



03.11 Displacement of the top weights.



03.12 Displacement of the bottom weights.



03.13 DOG bars marked.

Once the magnetic motors are balanced, the following tilt must be balanced properly by sliding the dog bars up or down in the straight down (*vertical*) position and check that it is required the same strength to spin the following tilt in both sides. To move the DOG bars, loose the knobs holding the DOG in place.

If the rest of the axis are properly balanced the roll axis does not need to be balanced, only check that manually reaches both mechanical ends. If for any circumstance it cannot reach one of the sides, the movement in this axis will be limited in that side but the stabilization will not be affected for this event.

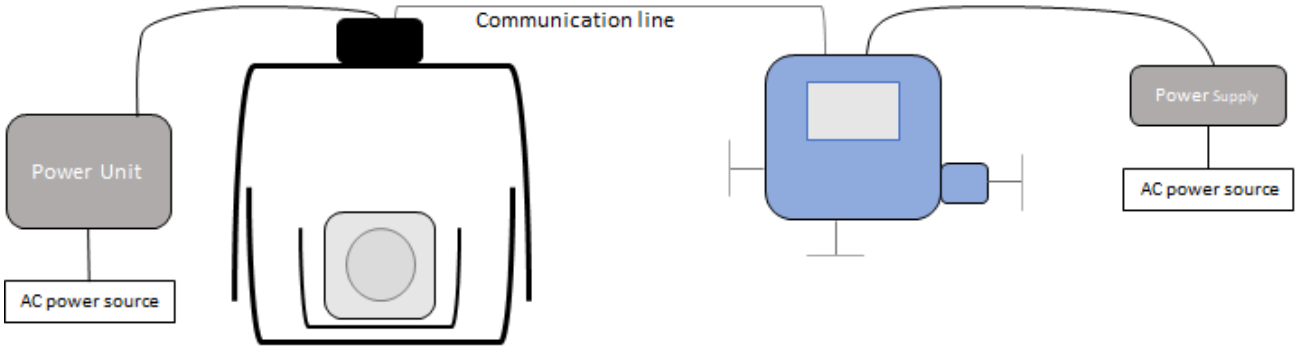
Note 1: It is always better to use components of the camera package to balance it instead of adding weights.

Note 2: In case of adding the rear counterweight support, recheck the balance in the frontal position (your weights in this axis may have changed).

Note 3: Before the head is started, every component in the camera package MUST be tight and secured.

3.3 CONNECTING THE SCORPIO V

To operate the 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 Scorpio Stabilized V, it needs to be done through the Multicore connector on the head using the SSV Cable adaptor to a standard Scorpio head.

To power the Scorpio Stabilized V, connect both 3pin XLR from the SSV Cable adaptor to the power supply. 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 switch from the power supply will flash in orange and the LED in front of the power supply will flash green. The head will receive power and it will start calibrating the ROLL axis by moving to both mechanical limits by itself. The magnetic motors will calibrate too by vibrating slightly.

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

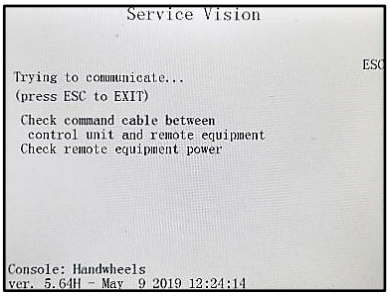
Note: Remember to connect <u>both</u> 3XLR cables to the power supply before the head is started.

3.4 COMMUNICATION 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 Scorpio Head V can be used with different kind of Scorpio controls but all of them must be upgraded to the CCU2000 PCB boards (*white touchscreen display*).

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

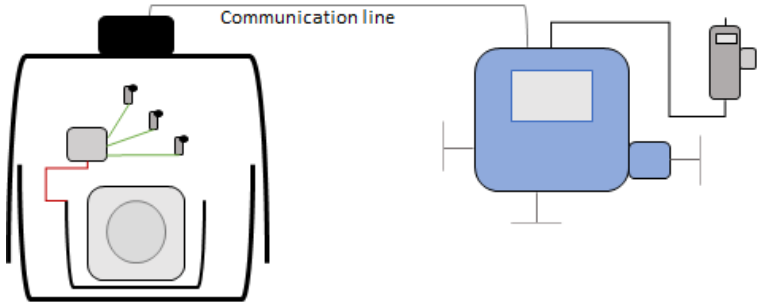


03.14 Trying to communicate.

Note: The control can be started while the head is in any position (for example the tilt axis can be 45ºoff 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. 03.14 will be shown).

3.5 CONNECTING A SCORPIO FOCUS SYSTEM BY WIRE

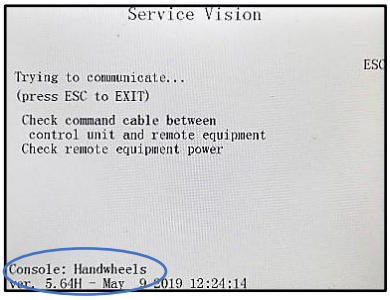


To connect a Scorpio Focus, the Motor Driver Box (M.D.B.) is connected with a red 5pin Lemo cable to the FIZ connector in the Head. That will provide power and communication to the MDB system.

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.

4 CONTROL DISPLAY INFORMATION

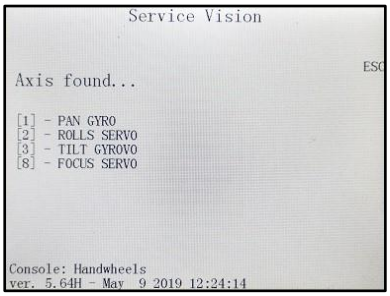
The following chapter describes the different screens from the controls when you connect them to a Scorpio Stab V.



04.01 Trying to communicate screen.

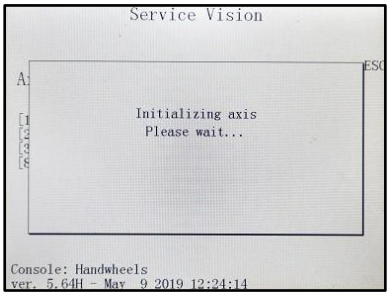
When the system is started, it tries to communicate with anything connected to the communication line. If it cannot find anything, the *fig.04.01* will be displayed on the screen.

The kind of control and the software version of the Control is displayed in this screen.



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 GYRO, TILT GYRO and ROLL GYRO. More axes can be connected (*Scorpio Focus, Dolly…*) and all of them will be identified in this moment.



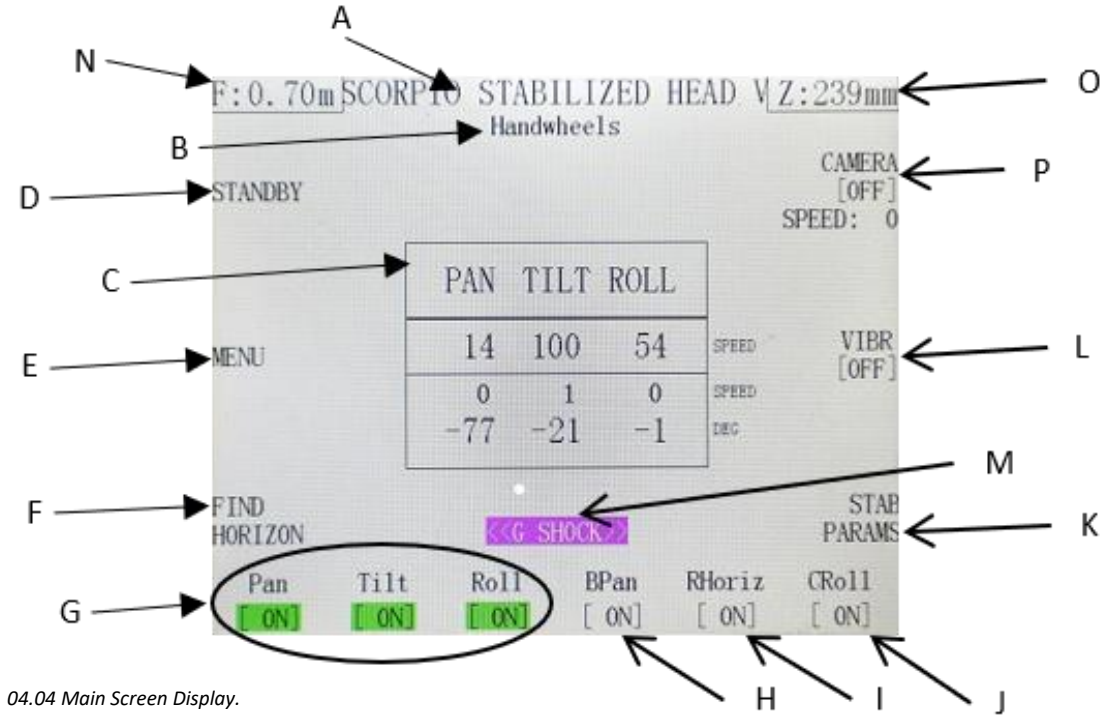
04.03 Initializing axis.

Once this identification has been done, the system starts initializing the axis (*fig.04.03*). This may last up to 30 sec.

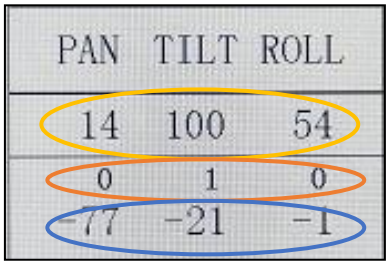
When the axes are initialized the head engages the motors and the main screen is displayed.

4.1 MAIN SCREEN

This is the main operation screen; it shows different information from the status of the Head.



04.04 Main Screen Display.



04.05 Axis names & information.

A – Max speed of each axis.

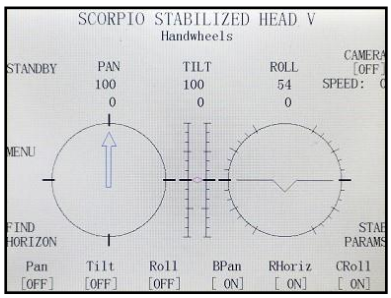
B – Actual speed of each axis.

C – Degrees of position.

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

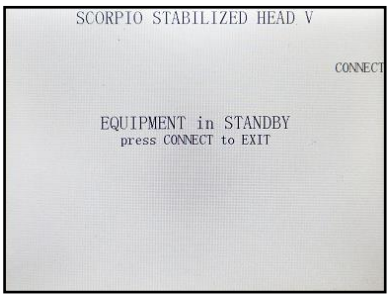
B) Control type: Name of the control (*Handwheels, Joystick, Pan bar*…).

C) Axis Information: Displays all the axis that can be controlled by the user. For each axis there is a Max. speed that can be adjusted with the potentiometers (*A in fig.04.05)*, the actual speed of the axis while moving (*from 0 to 100*), and the position in degrees of each axis (*C in fig.04.05*). There is an alternative display than shows the same information but graphically(*fig.04.06*). To change between the displays, press the middle of the touchscreen for 5 sec.



04.06 Alternative display for axis info.

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

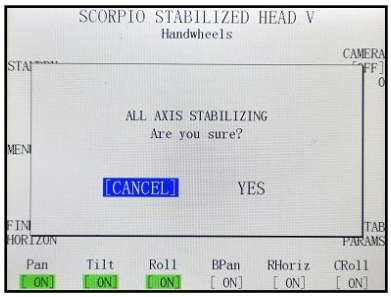


04.07 Standby screen.

> ***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 slower to the horizon.



04.08 Disconnecting Stab.

> ***Note: If the R horizon is OFF, the horizon will be the middle point between the calibration limits for the roll instead of the real horizon.***

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, makes the Head hold the same infinite point 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 not in the middle point of the roll calibration. It can be adjusted in the *Horizon adjust* menu in *Auxiliary*.

J) CRoll: It activates the Roll Compensation. This function sets the movement of PAN and TILT respect the ROLL and not respect the head. For example, if the ROLL is off by 10º, when the control makes a PAN movement, the Head will automatically move the TILT to compensate those 10º and make a panoramic movement respect the image.

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) Vibration (Shortcut): This area is for setting a shortcut access to different menus.

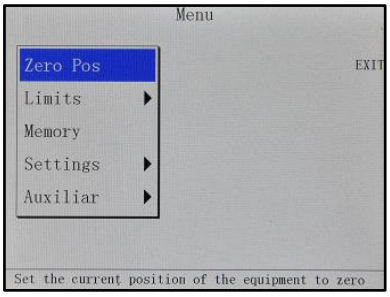
M) Alarm's display: If any alarm or warning is activated will be displayed in this area.

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

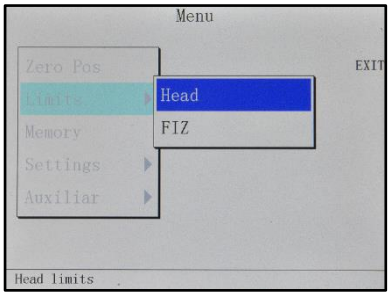
O) Focal zoom: Displays the focal zoom of the lens if the information is introduced into the system.

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

4.2 OPERATION MENU

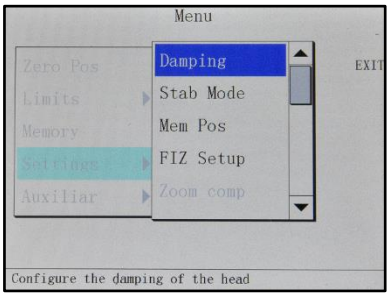


04.09 Menu dropdown tab.

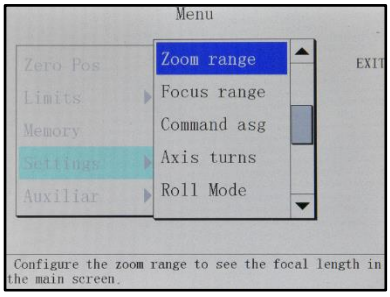


04.10 Limits menu.

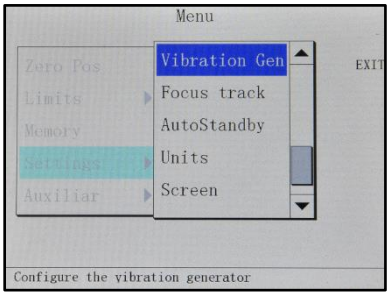
These are all the dropdown tabs available through the MENU button. Each menu is described below.



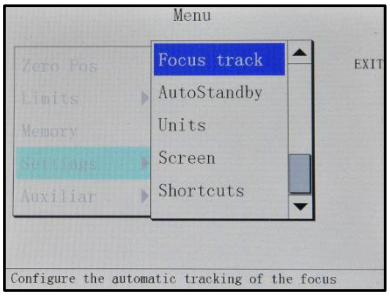
04.11 Settings dropdown 1.



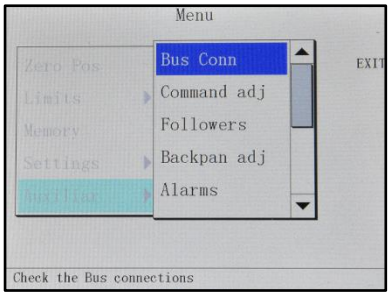
04.12 Settings dropdown 2.



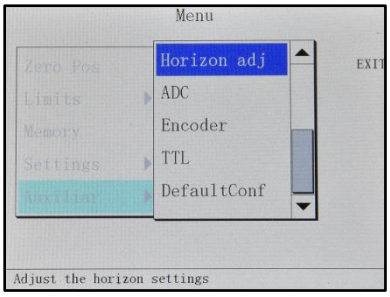
04.13 Settings dropdown 3.



04.14 Settings dropdown 4.

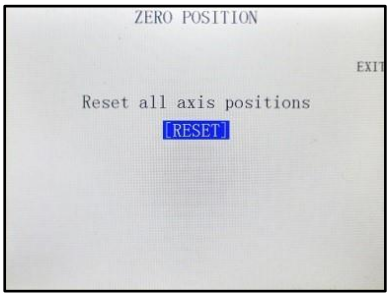


04.15 Auxiliary dropdown tab 1.



04.16 Auxiliary dropdown tab 2.

4.3 ZERO POS



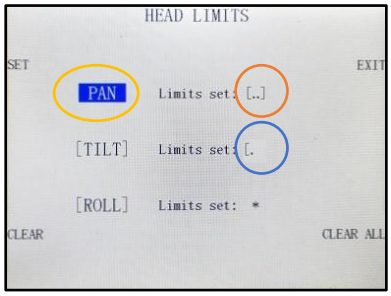
04.17 Zero Pos menu.

In the Zero pos menu it is possible to set the 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. 04.17*). For Tilt and Roll the zero position is always the horizontal position and it is set automatically.

The ZERO POS affects to the memories and the positions recorded from the system. Mark the head in the ZERO POS to prevent losing it in case there is an unwanted disconnection of the system.

4.4 LIMITS

4.4.1 HEAD LIMITS

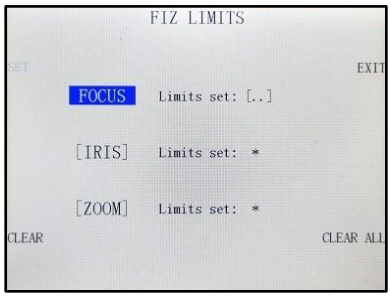


04.18 Head limits screen.

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

This menu sets safety limits on the movement on 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. 04.18*). 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.

4.4.2 FIZ LIMITS



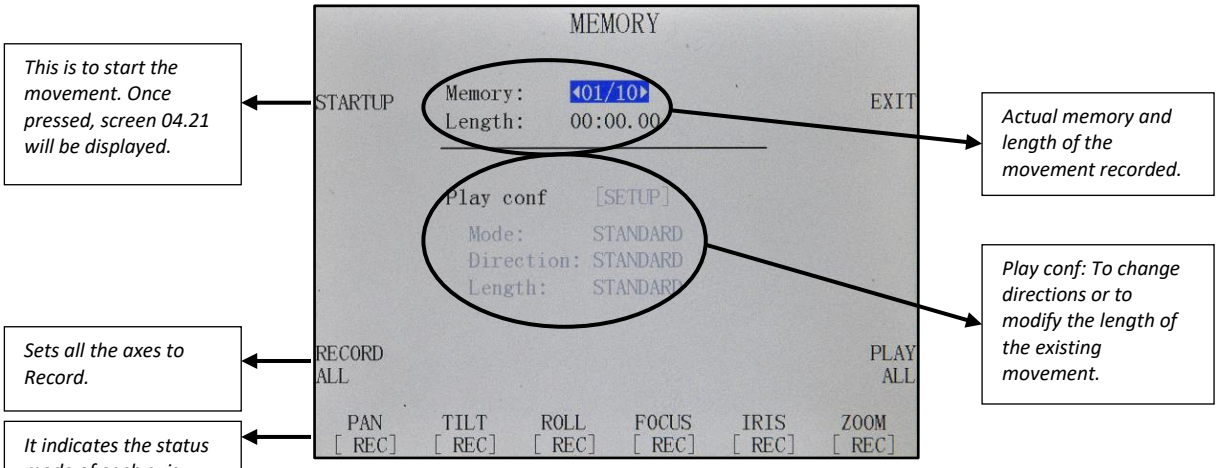
04.19 FIZ Limits.

FIZ Limits: In this menu it is possible to 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.

4.5 MEMORIES

The Memory menu allow to record movements of the head while stabilizing or as a regular head. 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.

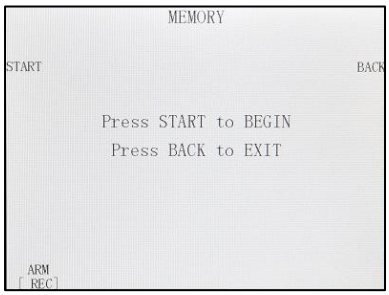
The system records the memory directly to an SD card located inside the control desk. In case there is no SD card, the system will not allow you to go further on the memory menu.



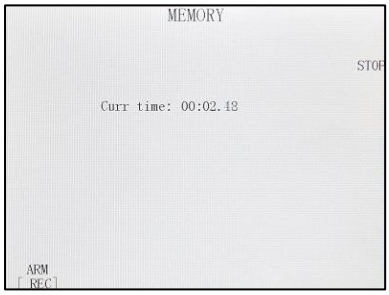
04.20 Memory menu main screen.

4.5.1 RECORD A MOVEMENT

There are 10 slots of memories. To record a movement, select which of those 10 memory slots will be recorded. Then, on the bottom left corner, 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.



04.22 Recording memory .

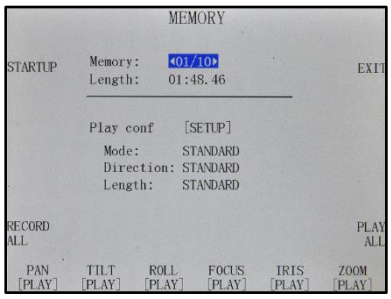
Now press STARTUP and the screen will change to *fig. 04.21*. While this is screen is being displayed, no movement will be recorded, allowing the user to relocate the camera at the starting position for its movement. The START button triggers the memory and a time counter will appear (*fig. 04.22*) indicating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

Once the take is finished, the STOP button finishes recording the memory. The maximum length of the recorded 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 to change all the axes states to play.

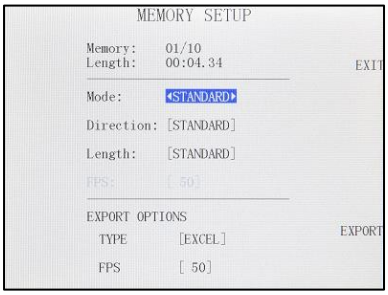
Then press the STARTUP button and the head will automatically go to the beginning position of the recorded movement (*this action is called HOMING*). Now *fig 04.21* is displayed again. Press the START button in the touchscreen and the same movement recorded will be reproduced.

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. To playback a precise memory, use the head with the STAB MODE disabled (see chapter special modes Non-stabilized mode) and without the iso damper.

4.5.3 CONFIGURE AN EXISTING MOVEMENT

By pressing the [SETUP] button on 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 will be available, and it can be selected the number of FPS.

DIRECTION:

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

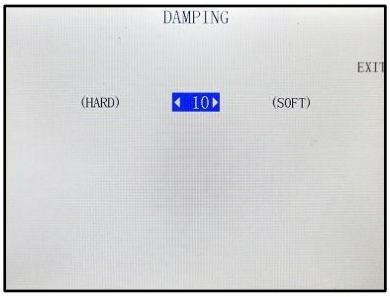
LENGTH: This is the length of the recorded movement; it can be multiplied by two as many times as needed to make it slower.

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 to reproduce the same movement.

4.6 SETTINGS

4.6.1 DAMPING

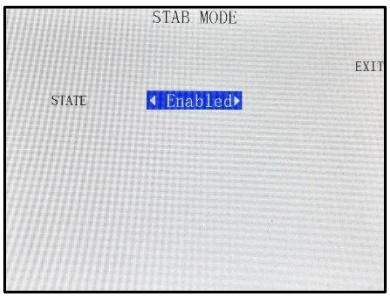


04.25 Damping menu.

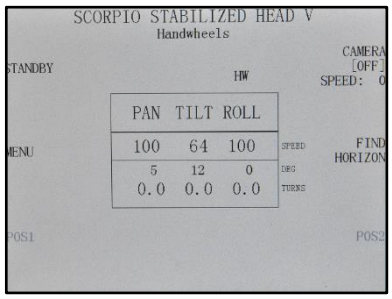
In this menu we can adjust the stopping ramp for all the axis of the head at the same time (*fig. 04.19*). The lower the value, the harder the stop will be.

4.6.2 STAB MODE

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



04.26 Stab mode.

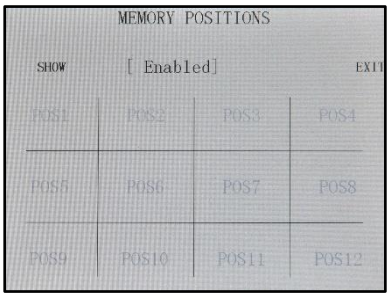


04.26b Main screen on regular mode.

In the regular mode the magnetic motors of the head will not work, they must be locked as shown in the *special modes chapter.* The regular mode can be used to improve the precision of the memories for example, or to perform a lock-off shot.

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



04.27 Memory position menu.

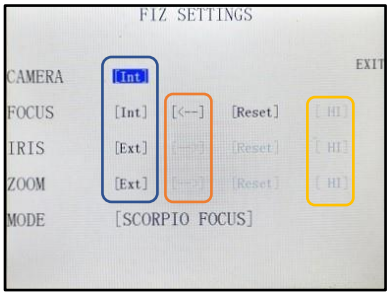
In the Memory positions screen, it is possible to record 12 different positions for the head. To do so, move the head to the desired position and press and hold the memory slot where this position will be recorded. To move the head to that desired position, press on the slot where it has been recorded 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 (*fig.04.26b*) 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 it in case of an unwanted disconnection of the system.

4.6.4 FIZ SETUP

This menu gives access to configure parameters from the lens motors and camera run (*fig. 04.28*).



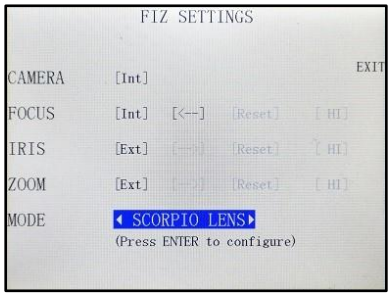
04.28 FIZ Set up screen.

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 A column in *fig.04.28* 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 (*B in fig.04.28)* is possible to change the direction of the motors (*for example in order to have the infinite in one end of the Focus controller or the other end).* 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.



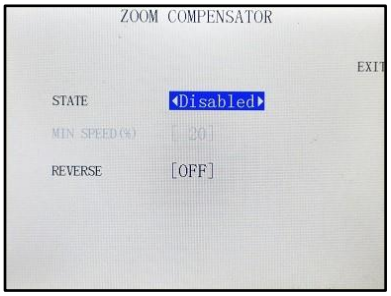
04.29 Scorpio Lens Control selected.

By pressing the Mode button, it changes between Scorpio Focus or Video Lens (*fig. 04.29*). This gives access to modify parameters of digital lenses.

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. 04.30*).



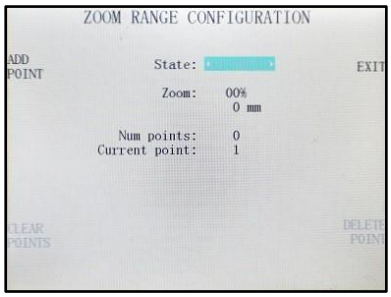
04.30 Zoom compensator menu.

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*).

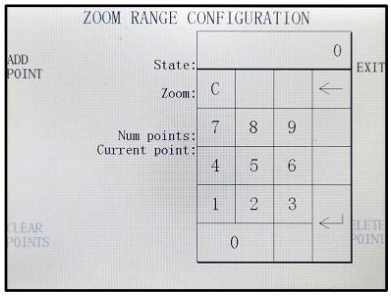
Note: This menu is only available if there is a Lens Control system connected (Scorpio Focus or Servo Lens Control).

4.6.6 ZOOM RANGE

This menu introduces the lens zoom scale into the system.



04.31 Zoom range screen.



04.32 Zoom Range keypad.

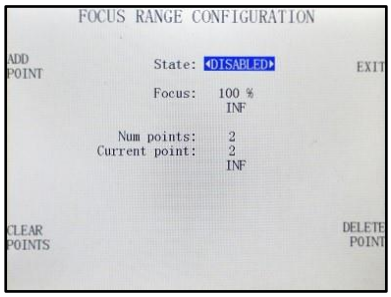
To start using it, move the zoom motor until one of the zoom marks on the lens is matched. In that mark, press the ADD POINT button (*fig. 04.31*). A keypad will appear to introduce the focal length of the mark using the enter button (*fig. 04.32*). Now repeat the same process with the rest of the marks 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)*.

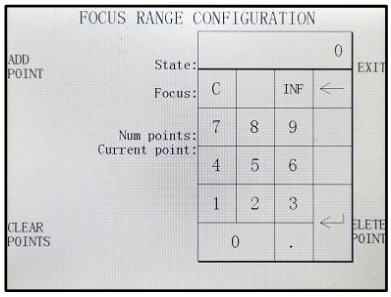
Note: This menu is only available if there is a Lens Control system connected (Scorpio Focus or Servo Lens Control).

4.6.7 FOCUS RANGE

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



04.33 Focus range screen.



04.34 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.

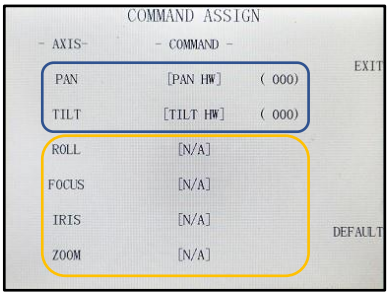
As in the Zoom range menu, in case one of the marks is not introduced properly, can be erased by moving the focus motor close to the mark and pressing the DELETE POINT button. To erase all the points, press the CLEAR POINTS button.

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 controller connected to the control.

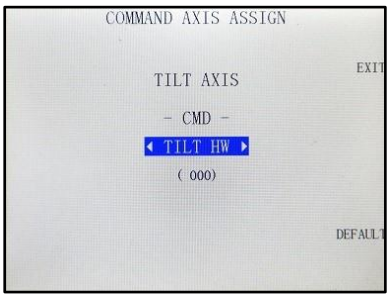


04.35 Command assign screen.

A- Axes assigned.
B- Not assigned axes.

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.04.35*).

To change the assignation for one axis, select the command from the command column that controls that axis and the axis assignment screen will appear (*fig.04.36*).

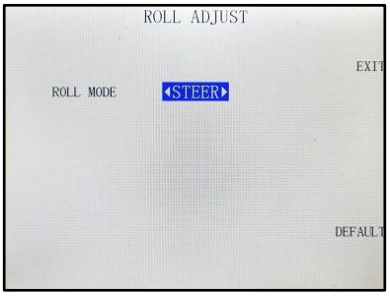


04.36 Assigning axis.

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 ROLL MODE

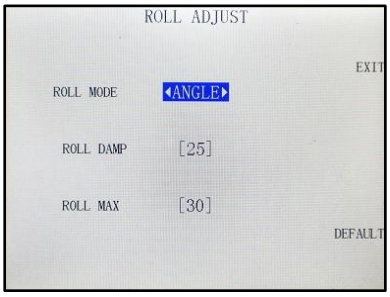
This menu changes the Roll Mode from STEER (*fig 04.37*) to ANGLE (*fig.04.38*).



04.37 Steer screen in Roll mode.

In STEER mode, the user can change the horizon to a different point and it will remain in that point.

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



04.38 Angle mode in Roll mode.

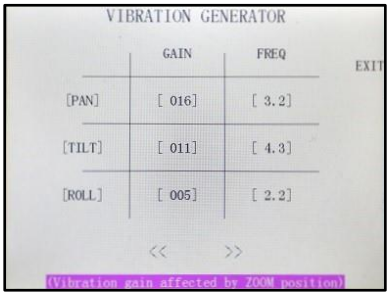
ROLL DAMP parameter adjusts the speed of the head coming back to the center and the ROLL MAX parameter adjusts the maximum angle that the roll axis will reach.

Note: The changes made in this menu are only visible with the Stabilization and the RHorizon ON.

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

4.6.10 VIBRATION GENERATOR

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



04.39 Vibration Generator.

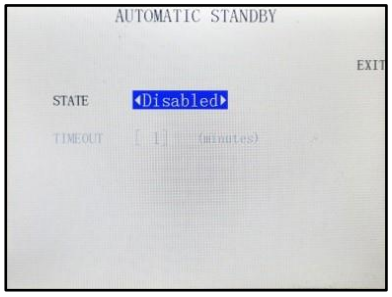
By pressing the axis name in this screen (*fig.04.39*), it activates a vibration in that axis and in the main screen that axis's speed will be marked in purple to indicate that a vibration is generated in that axis.

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.

4.6.11 AUTO STANDBY

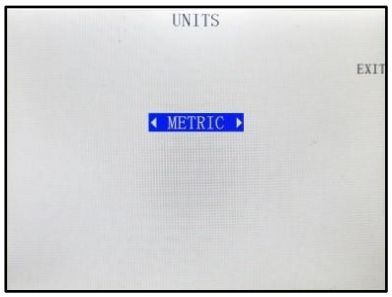


04.40 Automatic standby.

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.

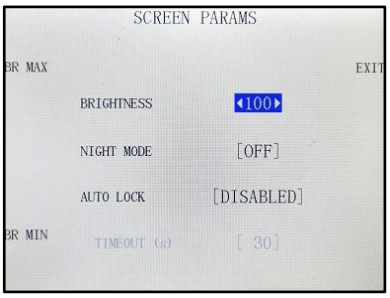
4.6.12 UNITS



04.41 Units.

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

4.6.13 SCREEN



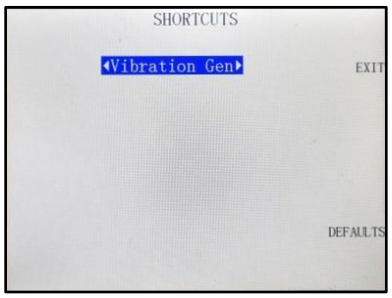
04.42 Screen set up parameters.

04.43 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.

4.6.14 SHORTCUTS



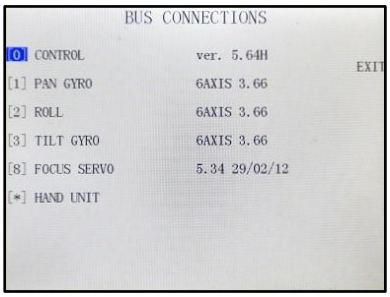
04.44 Shortcuts menu.

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.

4.7 AUXILIARY

This is the service menu, there are different submenus that helps troubleshooting or verify the correct performance of the system. The description for the Horizon Adj., Back pan Adj. and Followers, even if those menus are inside the auxiliary one, it is done in the chapter *Stabilization Adjustment*.

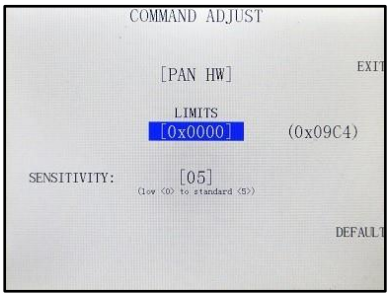
4.7.1 BUS CONNECTIONS



04.45 Bus connections.

In this menu everything connected to the communication line will be displayed. Also, is it 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

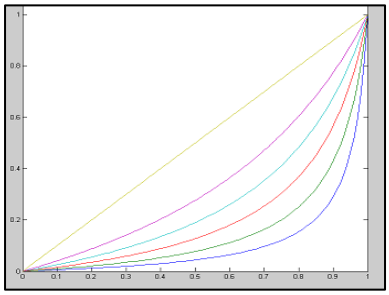


04.46 Command adjust screen.

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.04.46*).

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.



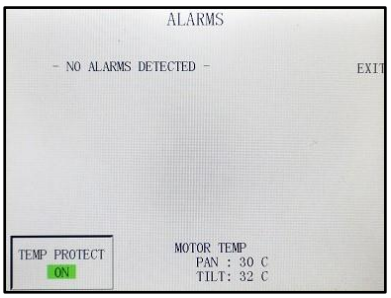
04.47 Sensitivity curves.

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 to 0 (*fig. 04.46*). The more this value is reduced, the more exponential the relation.

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.

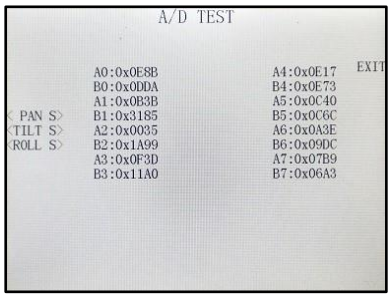
4.7.3 ALARMS



04.48 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.

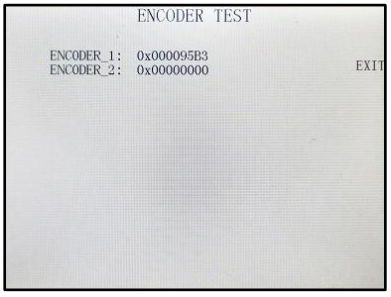
4.7.4 ADC



04.49 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.

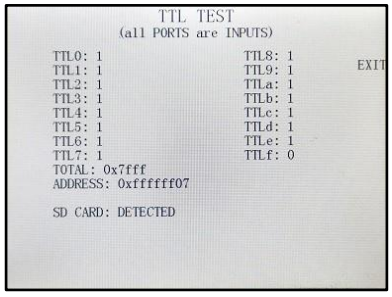
4.7.5 ENCODER



04.50 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.

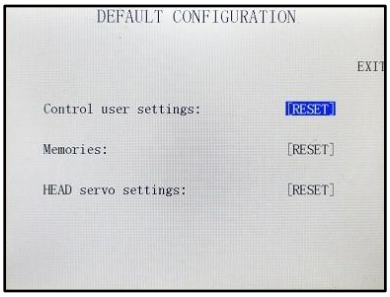
4.7.6 TTL



04.51 TTL Signals.

Displays the digital inputs (*buttons, selectors*…). In case one button is pressed or one controller is connected, this screen will inform if the CCU has acknowledge it.

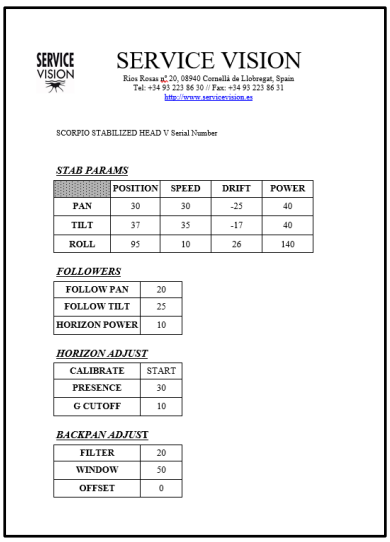
4.7.7 DEFAULT CONFIGURATION



04.52 Default Config.

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

4.8 ADJUSTING THE STABILIZATION PARAMETERS



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SCORPIO STABILIZED HEAD V Serial Number

STAB PARAMS

	POSITION	SPEED	DRIFT	POWER
PAN	30	30	-25	40
TILT	37	35	-17	40
ROLL	95	10	26	140

FOLLOWERS

FOLLOW PAN	20
FOLLOW TILT	25
HORIZON POWER	10

HORIZON ADJUST

CALIBRATE	START
PRESENCE	30
G CUTOFF	10

BACKPAN ADJUST

FILTER	20
WINDOW	50
OFFSET	0

04.53 Factory settings from a V Head.

With the Scorpio 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.

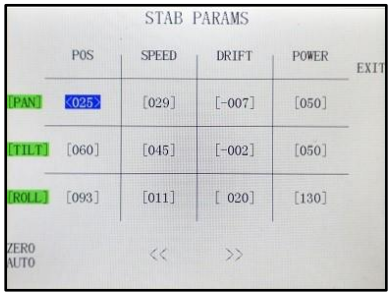
It is very important to identify which parameter to adjust in any situation, therefore in the following chapters there will be an explanation of the function of every parameter and the situations where it needs to be adjusted.

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.

4.8.1 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:



04.54 Stab parameters screen.

For all the axes the POS parameter adjusts how tight those axes are going to be to the “ideal” correction signal given by the sensors. The closer to zero in the magnetic axes (*PAN&TILT*), the closer to the “ideal” position. The roll has a factory “ideal” for any camera package since it works in a different way.

The SPEED parameter adjusts the frequency of the corrections. As the POS, the closer to zero in the magnetic axes (*PAN&TILT*), the more corrections per second. The ROLL axis works in a different way, and it is explained how to adjust it in another chapter.

Since an “ideal” camera package does not exist, it is impossible to get these two parameters to 0. Depending on the camera package it will be possible to improve more or less the stabilization.

The 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.

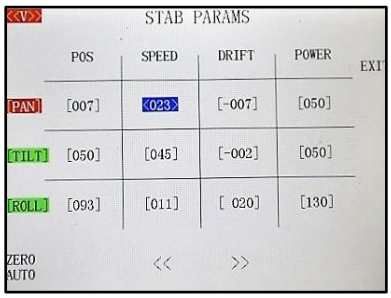
And with POWER it is possible to adjust the maximum power the system will apply to the magnetic motor in order to stabilize the camera package.

4.8.2 ADJUSTING THE STAB PARAMETERS (PAN & TILT)

To adjust the parameters, the head needs to be activated and the camera package secured and balanced as seen in the *chapter Set up the equipment*. The order to adjust the axes is ROLL, PAN & TILT. Normally the ROLL axis does not require to be adjusted (only DRIFT).

POSITION

The normal procedure is to activate the stabilization first in the PAN axis and move the TILT to +-45º respect the horizontal. Then set the SPEED value of the axis to be adjusted in a high value (80 to 100). Doing this we ensure that SPEED parameter does not affect to the proper adjustment for POS. Once this is done, decrease the POS parameter until an alarm appears (*fig. 04.47*). This alarm means that the Head is oscillating over the stabilization point. Increase the value of position until it stops oscillating and the alarm disappears. From this value, increase it 4 or 5 points to prevent the head to oscillate due to any high vibration.



04.55 Pan axis vibrating alarm.

SPEED

The SPEED can only be properly adjusted once the POS parameter has been tuned. Decrease the value of the SPEED parameter until the vibration alarm appears. This means that the axis is correcting too fast over the stabilizing point. The “buzz” provoked by this parameter has a different noise than the POS oscillation. From this vibrating point, increase it until the head stops vibrating and then give 4 or 5 points more as safety tolerance range for the head. Then adjust the TILT axis in POS and SPEED using the same procedure than the PAN axis.

Note: To do the best adjustment of POS&SPEED parameters, the position of the tilt must be at +-45º from the horizontal point. In this position is where the TILT and PAN axes can interfere on each other.

Note 2: once POS&SPEED are adjusted, force the Head to do sudden corrections to verify the right values. If the alarm is not triggered, the parameters are safe to use in any case.

Note 3: it could be that one axis triggers the alarm on another one. If so, disconnect the axes one by one until the alarm stops. Now the axis to be adjusted has been identified.

DRIFT

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. For Pan axis if this parameter is increased, it forces the head to move to the right. For Tilt axis if it is increased it moves the head up.

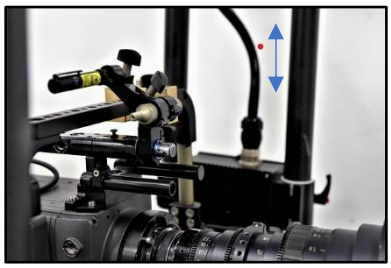
POWER

Normally, to adjust this parameter is only needed in case the head is mounted in a camera car or similar situations where the vibrations to be corrected are sudden and strong. Increase this parameter (*maximum around 100*) to give more strength to the motors against those vibrations.

4.8.3 ADJUSTING THE STAB PARAMETERS (ROLL)

From the factory, every head is adjusted with the best working values for this axis. Even so, if the user wants to adjust it, follow these instructions but notice that it is not possible to do it properly on set.

To adjust the parameters for the ROLL, the *RHorizon* feature needs to be disabled so it does not affect to the adjustments done in this axis. Mount a laser pointer attached in the weights bridge pointing laterally in order to see the oscillation in the ROLL axis (*fig. 04.56*). The farther is the wall to point the laser, the more precision in the adjustments.



04.56 Laser mounted in the roll axis to see the displacement of the roll.

POSITION

Shake the head by hand laterally, so the ROLL motor corrects that manual movement. Now check the amount of correction it has been done in the axis. Increase the value if the correction done by the system was not enough to hold the same position while the head is being shacked laterally. If the amount of correction is too much, the head will increase the degrees of displacement of the manual move.

SPEED

Increase or decrease this value until the speed that the head uses to correct the difference of position set with the POS parameter are the same. To see a difference, this value might be adjusted from 10 points in 10 points.

DRIFT

While the head is still and with the RHorizon deactivated, check if the laser point moves up or down on the wall. Increase or decrease until it holds the right position.

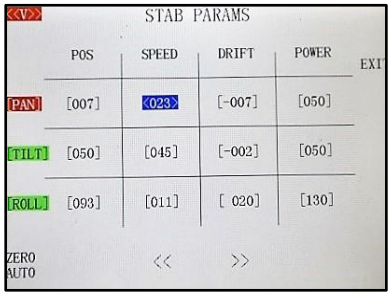
POWER

This parameter is set by the factory for every specific motor. It does not need to be adjusted unless a motor is changed.

Note: Remember to deactivate the RHorizon feature to make any adjustment in this axis.

4.8.4 ZERO AUTO

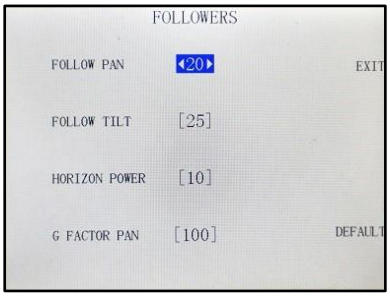
The Zero auto button is located at the bottom left corner of the Stab params screen (*fig.04.57*). When pressed, it disengages all the motor from the system and makes a reading of the actual conditions of pressure and humidity to set the Zero drift values of the head.



04.57 ZERO AUTO button

Note: It is not recommended to use this button unless the head is perfectly still. Even so, verify the roll DRIFT value after pressing this button.

4.9 FOLLOWERS



04.58 Followers screen.

In this screen the user can adjust the parameters referred to the non-magnetic motors and adjust their behavior as needed. These values may have to be modified depending on the mount of the head.

The function of the follower motors is to keep the magnetic motors in the middle of its working range, so the magnetic motor has the maximum range to correct in both directions. These parameters adjust how the nonmagnetic motors behave when following the stabilizing motors.

Note: To appreciate any change in these parameters, increase the values from 5 to 5 and then fine adjust them.

FOLLOW PAN & FOLLOW TILT

If these parameters are increased, the non-magnetic motors are forced to chase faster the magnetic ones. This may cause the follower motor to start oscillating because it tries to match the same speed than the magnetic motor. If this effect occurs, reduce this value for the follower axis that oscillates. It will not be seen in the monitor, the magnetic motor will correct the image, but it can be seen in the head.

If this parameter is decreased too much, the magnetic motor may not be able to correct big vibrations because the follower motors are not able to relocate the magnetic axis in time to correct it. In case the magnetic motor hits the mechanical end of its movement due to vibrations, increase the value of this parameter.

HORIZON POWER

This parameter adjusts the strength that the roll motor uses to hold the camera package in the horizontal position. If the value of this parameter is too low, the roll movement will be delayed. This delay will affect even for finding the horizon automatically or for moving the axis with any command controller. If it is too high, the roll axis might be too reactive, and it will overcorrect the axis when vibrations arrive to the head.

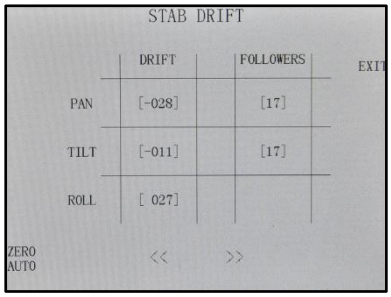
G FACTOR PAN

This is a parameter to compensate the displacement in the roll axis caused by the weight of the camera package. When a fast movement in the pan axis has been realized, it could be seen in the monitor a “wave” effect. Increasing this parameter will make disappear this wave effect.

The DEFAULT button turns all the values to the factory settings.

4.10 SHORTCUTS ON THE ADJUSTMENT

There is a shortcut to adjust the most common parameters on the stabilization. Short press the STAB PARAMS button on the main screen and *fig. 04.*59 will be shown.

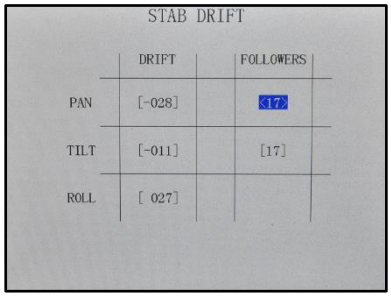


04.59 Drift & Followers adjust.

In this screen is possible to adjust the drift and the values of the followers by pressing the parameter to be adjusted and, once selected, using the arrows on the bottom part of the screen.

There is also acces to the ZERO AUTO button in this screen to make an autocalibration of the drift values for the head.

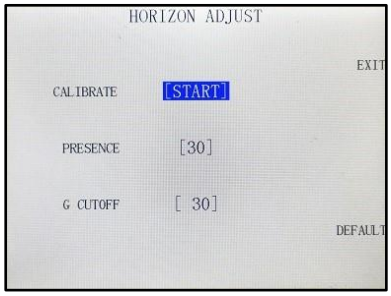
There are three red buttons labeled as PAN, TILT, ROLL on top of the controls. Once they are held one by one *fig. 04.60* will be displayed with the corresponding drift parameter flashed. With the tilt controller (*Tilt handwheel or moving a joystick on the tilt axis*) the value of this parameter can be modified.



04.60 buttons ROLL&PAN pressed.

If the ROLL button and either the PAN or the TILT buttons are pressed and held at the same time, the parameter flashed will be the corresponding follower motor of PAN or TILT and it can be modified also with the tilt controller.

4.11 HORIZON ADJUST



04.59 Horizon Adjust.

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 kind 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 takes the lead: the gyroscopes.

The gyroscopes are sensors used to read the external forces affecting to the head and their 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 the head.

With a combination of both sensors the system is able 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. In those situations, a waring 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 been reduced, 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 to the head if the R horizon feature is activated.***

CALIBRATE

This option allows the user to readjust both sensors if needed. There are two kind 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 on the horizon. In case it drifts, deactivate the stabilization, ensure the head is completely still and proceed with the PARTIAL calibration.

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, 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.

04.60 Position of the bubble level.

To do this calibration, deactivate the stabilization on all the axes and ensure the camera platform is 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.

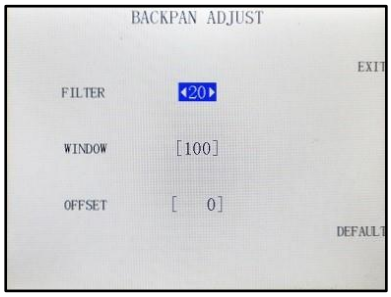
G CUTOFF

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.

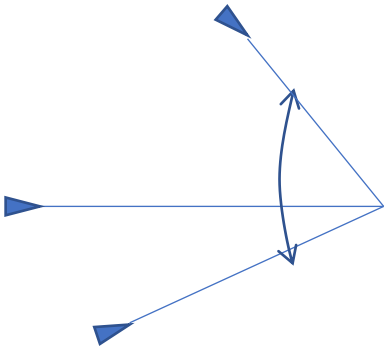
Note3: The "G-SHOCK" message is not an alarm, is just a warning for the user to inform that the gravity sensor reading is not being used, therefore it is not a problem if it is displayed in certain situations.

4.12 BACKPAN ADJUST

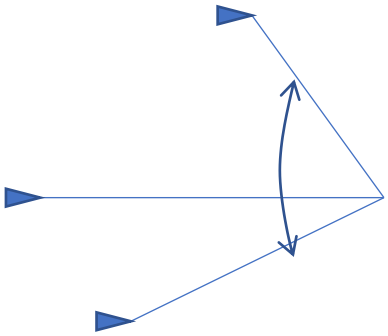
The Back Pan is a feature that makes the head hold the pan position even if the support where is mounted is spinning. All the stabilized heads have this feature but the Scorpio Stabilized V Head allows the users to deactivate the Back Pan feature without losing level of stabilization in order to make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



04.61 Back Pan adjust screen.



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.

WINDOW

The WINDOW parameter adjusts the range that the head has to follow the support when this one moves. The bigger the window, the more range the head holds the position before following the support.

OFFSET

The OFFSET is a parameter that allows the user to eliminate a movement of the head in the pan axis in case it appears. By making the WINDOW smaller, this parameter does not need to be adjusted.

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

The DEFAULT button turns all the values to the factory settings.

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 (free of toxic, dangerous or hazard materials), has 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 Stabilized V Head without any risk or danger:

- It is MANDATORY having perfectly balanced the Scorpio Stabilized V Head and the camera package secured BEFORE operating the Scorpio 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 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.
- Check that both sides of the follower tilt are ALIGNED. If not, the head could be damaged.
- Ensure there are cable ties on the carbon fiber bars for the follower holding the connector in place.
- DO NOT force the motors while the system is engaged.
- If the system is working in the non-stabilized mode (locking the magnetic motors with a bracket), DO NOT activate the stabilization.
- When the Scorpio Stabilized V Head is performing under the rain, PROTECT the camera and the DOG 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*).
- If the size of the Scorpio Stabilized V Head needs to be readjusted (sliding it along the carbon fiber bars) ALLWAYS do it with two people.
- Do not block the movement of the magnetic motors when wiring the camera package.

6 SERVICE & 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 MAINTENANCE

For a proper and correct maintenance, the Scorpio crane must always be revised 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 or lubricated since the conditions under the crane has been exposed in the previous days can be different every time.

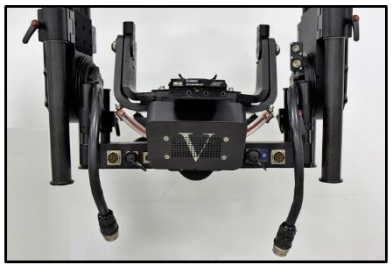
Note: Before doing any maintenance on the Head, be sure that the system is switched off or the standby button is pressed unless it is specified in this manual.

CLEANING

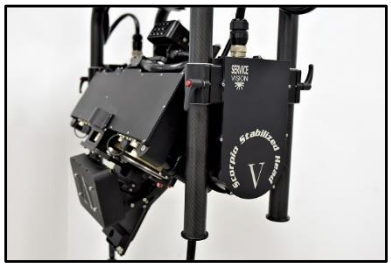
The Stabilized V Head is a heavy-duty head designed to perform in harsh environments. Therefore, it is mandatory to clean it every time it is exposed to those environments. To clean it use a dry rag to remove the dust from it or apply degreaser to the rag to remove the grease of the machine. Compressed air can be used to reach the hard to access places.

The carbon fiber bars need to be dry and clean. The roll gear and the roll guides can be lubricated with motorcycles chain's oil applied with a rag once they are clean and degreased.

DISMOUNTING THE DOG



06.01 Disconnect cables from the DOG.



06.02 Position to remove the DOG.

To disassemble the DOG of the TILTs axes it is needed to disconnect the connectors from the TILTs to the DOG. To do it, twist counterclockwise the metallic part of the connectors and it will release the cable.

Once it is disconnected, move manually the DOG to the position shown in *fig.06.02*. In this position the DOG is rested in the mechanical limit. Now is safe to remove the safety caps from the DOG bars and release the knobs holding those bars.

Now pull gently from the bottom part and the DOG will be released from the rest of the Head.

To assemble it, move the TILT axes in this position and introduce the DOG bars in the TILT axes and secure it with the knobs. Then mount the safety caps in the bars.

6.3 SERVICES

ALIGNMENT OF FIBER BARS

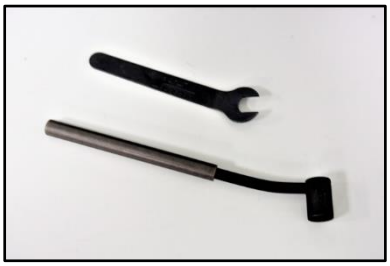
06.03 Bracers to loosen to align the bars.

Due to the torsion forces suffered by the Head while performing, it could happen that the carbon fiber bars get slightly twisted. To align the fiber bars, bring the follower tilts as close to the follower pan as possible by sliding them along the bars. The DOG bars need to be tightened all of them in the same position. If the DOG is twisted respect the TILT axes it will not be possible to align the bars.

In this position, loosen 3 of the 4 bracers on the follower pan side in order to settle them in the right position respect the fix one. The fix one needs to be leveled respect the follower pan (check with bubble levels the position of the bar respects the follower pan). Now tight them again and check the movement of the follower tilts along the fiber bars until the movement is smooth. If necessary, repeat the process.

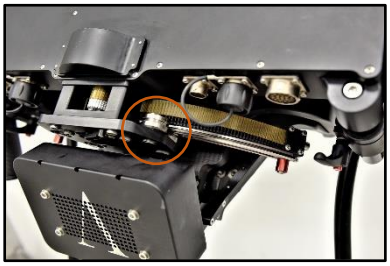
ADJUST THE ROLL RAILS

In the tools kit there are two special tools to adjust the roll rails. One socket wrench and one fix wrench.



06.10 Tools to adjust the roll rails

There are 8 guiding wheels for the roll rails: 4 in front and 4 in the back part of the camera platform. The top wheels are fix wheels (*there is no need to adjust these wheels)*, the bottom wheels are eccentric and they can be adjusted to ensure that there is no mechanical play between the inner axis and the followers.



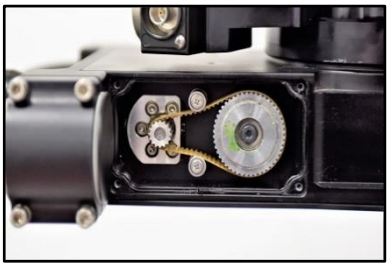
06.11 Roll rails and guiding wheels

To adjust the eccentric wheels, introduce the fix wrench between the guiding wheel and the support where it is attached. Loose the outside nut using the socket wrench and then move the fix wrench in order to bring closer the guiding wheel to the rail using the eccentric axis.

Once there is no mechanical play between the guiding wheel and the rail and it is possible to move the wheels by hand (*with certain resistance*), tight the set nut using the socket wrench to lock this position.

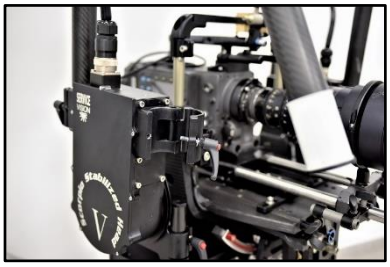
Repeat the same process for all the bottom wheels if needed. It is necessary that these wheels are properly adjusted in order to be able to correct all the vibrations on the camera.

REPLACING THE BELTS



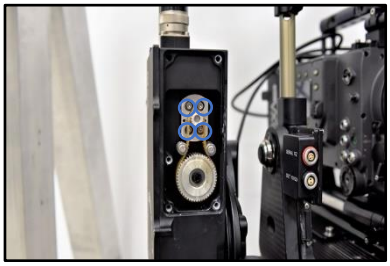
06.04 Pan belt

Pan Belt: Open the cover for the Pan belt by removing the screws in the Pan follower axis (*M3x8 DIN912)*. Now loose the 5 Allen screws inside the register to loosen the tension of the belt (*the ones closer to the small gear*). Remove the belt and replace it with the new one. Apply tension to the belt by pushing the small gear away from the big gear and tight the M3 Allen screws.



06.05 Access to the Tilt belt

Tilt belt: To access to the tilt belt, open completely the knob of the tilt belt cover in order to slide away the carbon fiber bar (*fig. 06.05*) and have access to the M4 Allen screws from the Tilt belt cover. To move the carbon fiber bar, it might be necessary to loosen the bracer that holds it on the pan axis



06.06 Screws to loosen the Tilt belt tension

Remove the M4 Allen screws from the side cover and the star screw holding the belt cover from the outside cover. Now loose the Allen screws inside the register to loosen the tension of the belt (*the ones closer to the small gear on fig.06.06*). Remove the belt and replace it with the new one. Apply tension to the belt by pushing the small gear away from the big gear and tight the Allen screws.

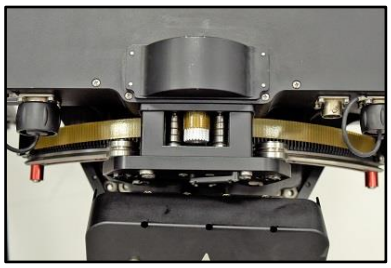
Mount the covers back and lock again the carbon fiber bar.

06.07 Tensor for roll belt

A- Holder for the belt
B- Set screw for the tensor
C- Tensor of the belt

Roll Belt: To remove the roll belt it needs to be removed from the holders at the end of the roll rails by unscrewing the 4 screws from the holders (*M3x8 DIN912)*. Then the belt gets loose and can be removed by pulling.

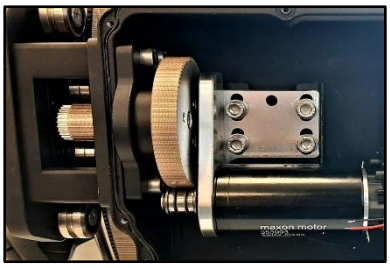
To assemble a new one, it needs to be introduced from both sides of the roll main gear and under the tensors (*fig. 06.08*). To do it easily, the roll can be moved as the belt is being introduced.



06.08 Roll belt

Once the belt is introduced, attach the holder in one side. On that same side, loose the set screw for the tensor and loose the tensor screw (*M6x35 DIN912)* as much as possible in order to be able to tight it once the other side is assembled.

Lock the belt on the other side of the roll and, with both sides locked, move the Roll axis to one end in order tight the other end. Apply tension with the tensor screws and lock them in place with the set screws.



06.09 Internal roll belt

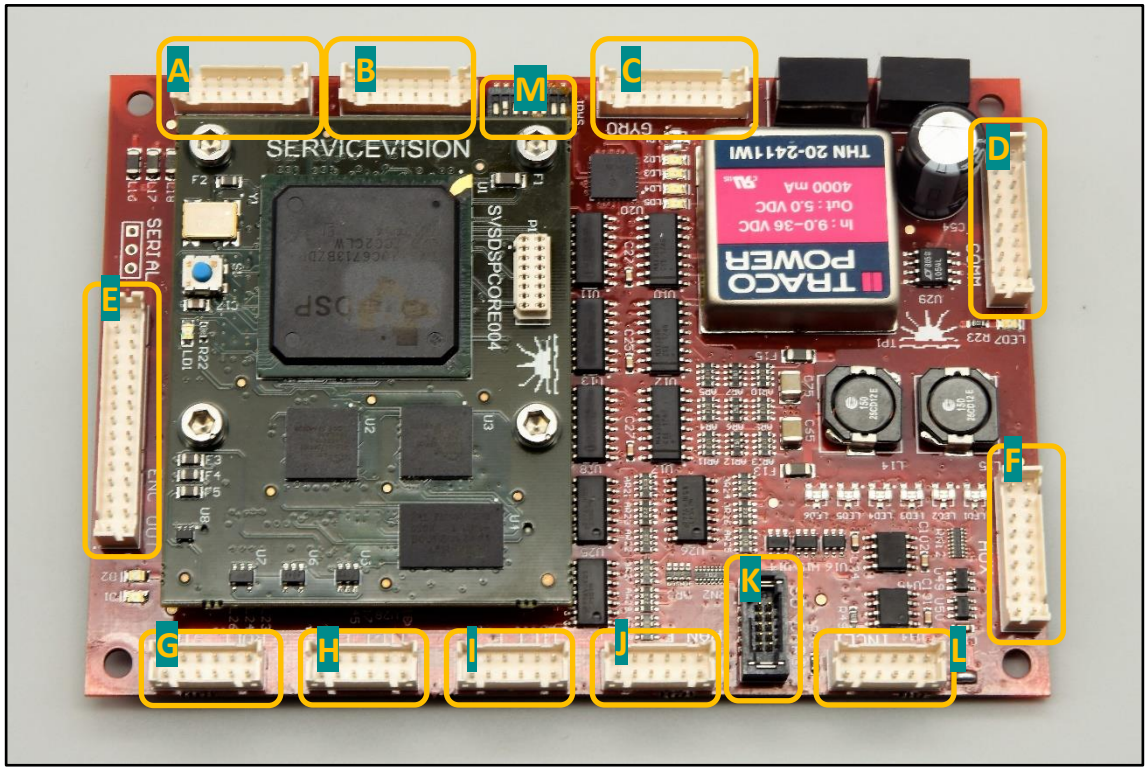
Internal roll belt: To remove this belt the motor needs to be detached loosen the four Allen screws from the *fig. 06.09*. Remove the motor in order to remove the belt and replace it. If necessary, dismount one tensor on the motor block to make it easier to assemble the belt.

Belt	Servicevision reference	Commercial reference
Follower Pan belt	0832	T2,5 x 177,5
Follower Tilt belt	0832	T2,5 x 177,5
Roll belt	0851	T2,5 x 950 (2 belts)
Internal Roll belt	0852	T2,5 x 230

REPLACE PCB BOARDS

BOARDS DESCRIPTION

There are 4 different kind of PCB boards in the Stabilized V Head: The 6axis board (*the main board of the head*) and three different kind of driver boards.

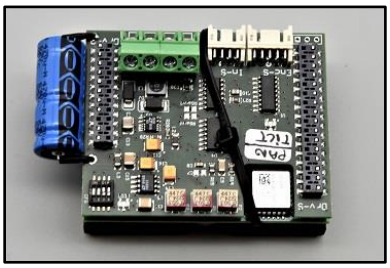


06.11 6Axis board (Main board)

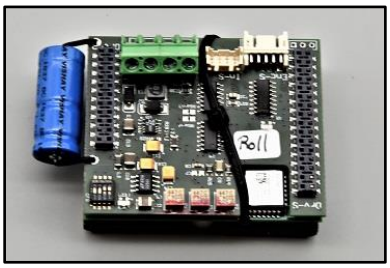
The 6axis board is on charge of all the functions of the head (*stabilize, move the motors, and communicate with the control among others*). The detail of the connectors in the main board are:

A. Tilt Stab: This connector communicates the main board with the driver for the magnetic TILT and the magnetic motor.
B. Pan Stab: This connector communicates the main board with the driver for the magnetic PAN and the magnetic motor.
C. Gyro: This connector receives the signal of some sensors on the head.
D. Comm: This is the main connector of the board. The communication lines come into this connector as well as the absolute encoder.
E. Encoder out: This connector is the output for the encoders in the pan & tilt followers and the roll.
F. Aux: This connector has different outputs. It is used to power a PCB board inside the head.
G. Roll Stab: This connector communicates the main board with the driver for the ROLL and the ROLL motor.
H. TILT_F_2: This connector is not used in the STAB V head.
I. TILT_F_1: This connector communicates the main board with the driver for the follower TILT and the TILT motor.
J. PAN_F: This connector communicates the main board with the driver for the follower PAN and the PAN motor.
K. SD Card: This connector is for the SD Card reader. It is used to load software into the board.
L. Incli: This connector receives the signal of some sensors on the head.
M. SAd1: This DIP switch marks the function of the board. For the STAB V: 1 ON, the rest, OFF.

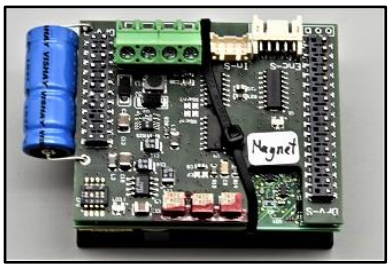
There are 3 different driver boards. The driver boards receive the signals from the servo and gives the proper power for the motors.



06.13 Driver for the PAN/TILT followers

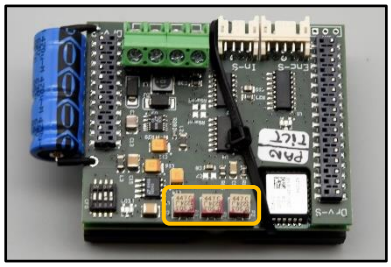


06.14 Driver for the ROLL axis



06.15 Driver for the magnetic motors

Each driver has two PCB boards: Top and bottom.



06.13 Potentiometers on the driver

The top part has 3 potentiometers (*from left to right):* P3, P1, P2.

P3: Offset (*Adjusts the 0 of the output)*

P1: Gain (*Adjusts the relation between the signal received and the voltage output)*

P2: Current loop (*Adjusts the "torque" applied to the motor)*

The bottom part for the non-magnetic axes is the same, the difference between the top parts is the position of one connector in the roll driver in order to fit the driver inside the head.

The bottom part of the magnetic axes is different of the non-magnetic axes. The top part of the magnetic axes and the roll driver is the same.

The switch configuration for non-magnetic axes is: 1,2 OFF 3,4 ON.

The switch configuration for magnetic axes is: 2 OFF 1,3,4 ON.

In case of an emergency (*one top part is not working*), it is possible to assemble the top part of any kind of driver to the bottom part of a specific one in order to finish the shooting day. Once the day is finished, it must be replaced for the proper top part that has already been preadjusted from the factory.

Note: The drivers are preadjusted by factory. There is no need to adjust the potentiometers.

BOARDS LOCATION

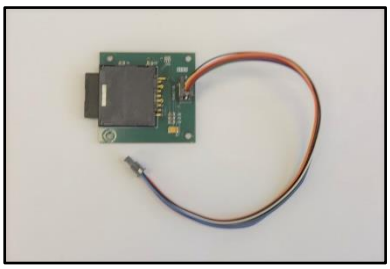
The location of the boards is the next one:

Inside the bottom cover of the DOG	-6axis board, Driver for the ROLL, Driver for the magnetic PAN, Driver for the magnetic TILT
Master follower tilt axis cover	-Driver for the follower tilt
Follower pan axis bottom cover	-Driver for the follower pan

To have access to the specific PCB board, open the assigned cover and replace all the connectors from that board. The driver is attached by two screws on the rear part of the heat diffusor plate. Ensure that all the DIP switches from the new board are the same than the board to be replaced. Detach the driver from the rear part (*for the drivers in the DOG the plate under the drivers must be detached)* and replace the driver.

UPDATE THE SOFTWARE FOR THE 6AXIS BOARD

The 6axis board 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. 06.16*).

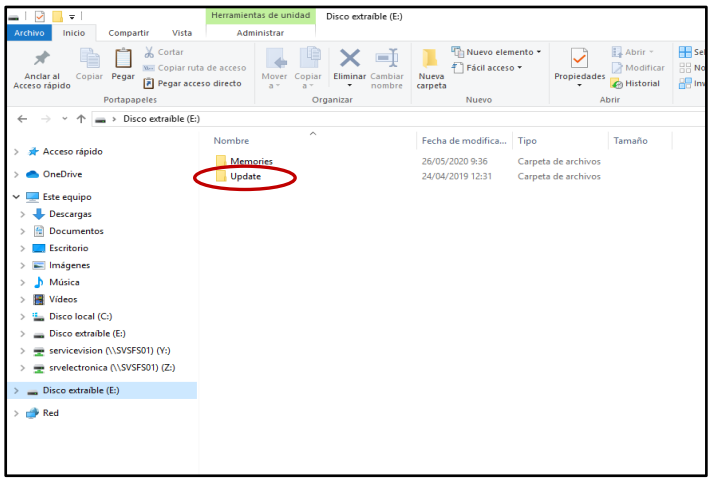


06.16 SD Card reader

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:

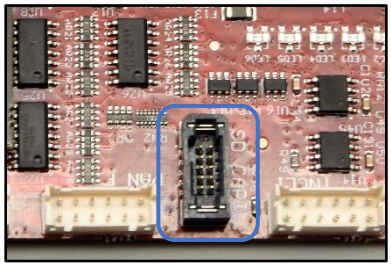
X:\UPDATE*.bin. (*X is the name of the SD CARD in the computer).*



06.17 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. 06.18)*.

Apply power to the head and keep the reader connected until it starts moving the ROLL axis to find the zero position. Switch off the head and disconnect the SD card reader. Now the software has been updated.

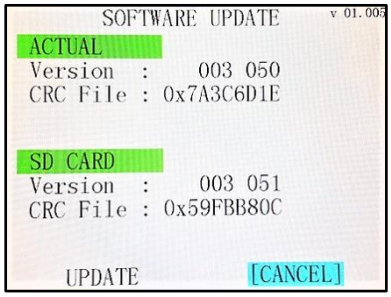


06.18 SD Reader connector

Note: Wait until the head starts to calibrate the roll by itself before switching it off and remove safely the SD card reader.

UPDATE THE SOFTWARE FOR THE CONTROLS

06.19 SD card slot in the controls



06.20 Update screen

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

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).

Once the file is in the SD Card inside a folder called update, introduce the SD card into the SD card slot in the control. Apply power to the control and the *fig. 06.20* will be displayed in the screen.

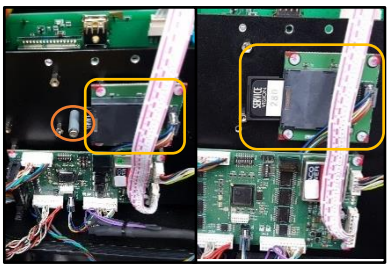
To update the software, press the UPDATE button and the software from the SD card will replace the actual software version from the control.

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

06.21 Allen screws from the control

06.22 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.



06.23 SD Card reader and 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. 06.20* 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: Ensure that in the folder UPDATE there is only the software to be loaded and it is a head software.

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
Absolute Encoder	-The absolute encoder for the Tilt axis does not work properly. It could be that the tilt mechanical position, limits and the stabilization does not work properly causing damage to the equipment. -If this alarm persists, restart the head, and start it again with the DOG's position aligned with the carbon fiber bars in the underslung position (the camera package between the DOG and the following PAN). This will allow the user to finish the shooting before contact Servicevision.
Real Horizon not detected	-The RHorizon feature did not identify some sensors. -Restart the head.
Real Horizon detected errors	-The RHorizon feature cannot work properly. It could be caused by a failure of a sensor or one cable broken. -Restart the head. -Check the connector INCLI on the servo board (*see boards description chapter to identify it*)
Temperature	-This alarm appears when one or both magnetic motors' temperature has reached critical levels. At 65ºC the alarm will be displayed. At 70ºC, the corresponding motor will be disabled to prevent any damage caused on the motor. -If for any reason (*sensor error, etc.*) the user wants to disconnect the temperature protection, it can be disabled pressing the button in the left bottom corner. -Check if the magnetic motor is mechanically locked. That could be the reason of the overheating.
GShock	-The head has stopped using the gravity sensors. -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. - -If it persists restart the head.
Axis not initialized	-The axis could not initialize. Restart the head and check that every axis can move freely.
Axis vibration	-The axis (PAN or TILT) is vibrating, check if there is something loose in the camera package, if not, increase the values (POS, SPEED) for the stabilization.

Note: If any of these alarms persists after readjusting the system, 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	-Identify the drifting axis -Verify the calibration from the controller of that axis (*chapter 4.6.2 Command adjust*). -If the head has the stabilization ON in that axis, adjust the DRIFT parameter accordingly.
The level of stabilization is not the desired	-Ensure the upper bridge is mounted and properly secured. -Check the camera package to identify any loose part and tight it. -Ensure BOTH frontal brackets are attached to the camera rods. -Check the balance of the camera package and rebalance if needed. -Readjust the parameters for the stabilization accordingly.
There is a buzzing noise coming from the head	-Ensure the upper bridge is mounted and properly secured. -Ensure BOTH frontal brackets are attached to the camera rods. -Identify the axis that is causing the buzz by switching OFF the stabilization axis one by one until it stops. -Readjust the stabilization parameters accordingly (*may need to increase the values of POS and SPEED on that axis).*
The Head does not communicate with the control	-Verify the status of the Standby button on the Head. -Check that the main connector in the Head is properly locked. -Check the cables between the Head and the control (*Communication cable, SSV Adaptor to standard Scorpio).* -Check the master TILT side cable. -Contact Servicevision.
The stabilization works properly but the head is vibrating	-Ensure the upper bridge is mounted and properly secured. -Check the Mitchell mount nut to verify that is properly tight. -Ensure BOTH frontal brackets are attached to the camera rods. -Adjust the FOLLOWERS values of the vibrating axis (*decrease them*). -If it is vibrating violently, switch off the stabilization and adjust the followers before activating the stabilization again.
The Horizon is not hold properly	-Check that the axes of the head are properly balanced. -If when the *Find Horizon* button is pressed the horizon is not the proper one, a COMPLET calibration needs to be done. -If when GShock alarm the head loses the horizon, a PARTIAL calibration needs to be done.
There is an alarm in the display	-Check the *chapter 7.1 Alarm display* for detailed information about the alarm
The roll always returns to the center	-Check the roll mode screen. It might be in angle mode.
The magnetic motor moves, but the follower motor does not	-Check the belt for the follower motor. -Check the cable connections between the axes (*including the dog connectors*). -Contact Servicevision.

8 SPECIAL CONFIGURATIONS

8.1 NOT STABILIZED MODE

To work with the head in a not stabilized mode it is necessary to block the magnetic motors. To do so, start the system as working normally and once it has done the calibration on the ROLL axis and the magnetic motors are free. Balance the head as shown in the *chapter 3.2 Balance the camera package*. Once it is balanced, connect the control, and disable the stab mode as seen in *chapter 4.6.2*. with the stab mode disabled, block the motors as shown in the fig. 08.01.

08.01 Block for the magnetic motors

Note: Under any circumstance activate the stabilization in any axis with the block on the magnetic motors. It may cause the motors to overheat and eventually burnt.

In this mode the head works as a regular remote head and can be used to do lock-off shots among other features such as record memories with precision or use the focus track function.

8.2 FOCUS TRACK FUNCTION

Contact Servicevision for further information.

8.3 NODAL ROLL ACCESORY

Contact Servicevision for further information.

9 DOCUMENTATION

9.1 PINOUTS

Connectors from the Head:

Encoder output connector (SOURIAU 12Pin Female Panel UT001412SH)

A. ENC. A1+ PAN F.
B. ENC. A1- PAN F.
C. ENC. B1+ PAN F.
D. ENC. B1- PAN F.
E. ENC. A2+ TILT F.
F. ENC. A2- TILT F.
G. ENC. B2+ TILT F.
H. ENC. B2- TILT F.
J. ENC. A3+ ROLL F.
K. ENC. A3- ROLL F.
L. ENC. B3+ ROLL F.
M. ENC. B3- ROLL F.

Camera power connector (SOURIAU 4Pin Female Panel UT00104SH)

A. 12 V A
B. GND. A
C. 12 V B
D. GND. B

C. ROLL connector (SOURIAU 8Pin Female Panel UT0012-8SH)

A. 30 Vdc.
B. GND.
C. 485 N.
D. 485 P.
E.
F.
G.
H.

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

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

Witness camera connector (LEMO 2 pin female panel EGG -1B.302.CYM)

1 12 Vdc.
2 GND.

The auxiliary connector has 10 pins that matches the same pinout on both sides. It has not defined purpose and can be used by the user as pleased.

Common connectors on the controls:

VDC 24/30V (Neutrick 3 pin male)

1 30 Vdc IN
2 GND
3 NC

12V/3A (Neutrick 4 pin female)

1 GND
2 NC
3 NC
4 12Vdc OUT

Head command (Neutrick 6 pin female)

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

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

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

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

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

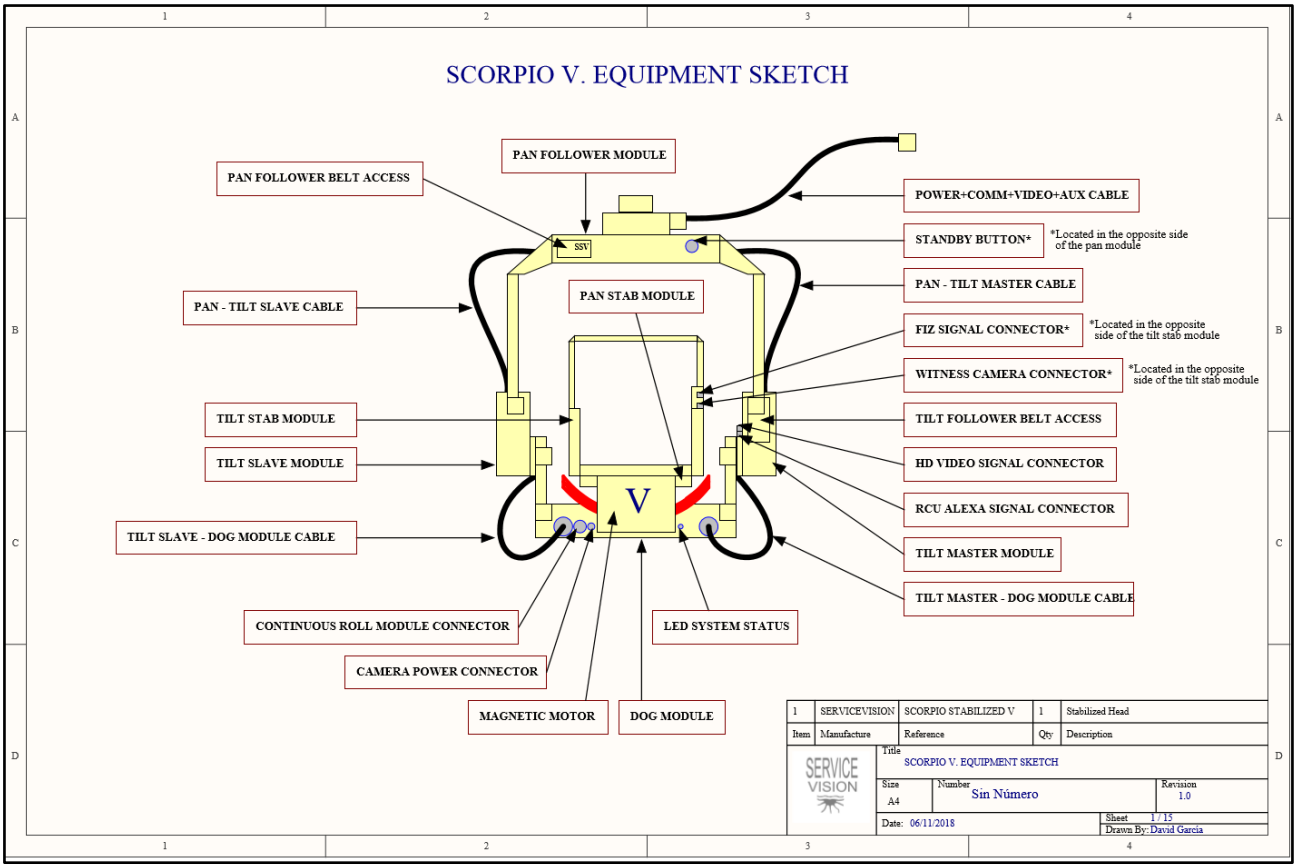
JDR ZOOM (Lemo 6pin female EGG -1B.306)

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

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

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

9.2 DRAWINGS


SCORPIO V. EQUIPMENT SKETCH
PAN FOLLOWER MODULE
PAN FOLLOWER BELT ACCESS
POWER+COMM+VIDEO+AUX CABLE
STANDBY BUTTON*
*Located in the opposite side of the pan module
PAN - TILT MASTER CABLE
PAN STAB MODULE
PAN - TILT SLAVE CABLE
FIZ SIGNAL CONNECTOR*
*Located in the opposite side of the tilt stab module
WITNESS CAMERA CONNECTOR*
*Located in the opposite side of the tilt stab module
TILT STAB MODULE
TILT FOLLOWER BELT ACCESS
TILT SLAVE MODULE
HD VIDEO SIGNAL CONNECTOR
RCU ALEXA SIGNAL CONNECTOR
TILT SLAVE - DOG MODULE CABLE
TILT MASTER MODULE
TILT MASTER - DOG MODULE CABLE
CONTINUOUS ROLL MODULE CONNECTOR
LED SYSTEM STATUS
CAMERA POWER CONNECTOR
MAGNETIC MOTOR
DOG MODULE
SSV
V
1 SERVICEVISION SCORPIO STABILIZED V 1 Stabilized Head
Item Manufacture Reference Qty Description
SERVICE VISION
Title SCORPIO V. EQUIPMENT SKETCH
Size A4
Number Sin Número
Revision 1.0
Date: 06/11/2018
Sheet 1 / 15
Drawn By: David Garcia

9.3 OTHER DOCUMENTATION

ENCODER OUTPUT RESOLUTION

Encoder A/B phase: 90º Z output: not available

PAN: Encoder Resolution: 500 points Gear factors: 130:1

Encoder output resolution: (130 / 1) x 500 = **65.000 points/turn** or **180.5555 points/deg**

TILT: Encoder Resolution: 500 points Gear factors: 130:1

Encoder output resolution: (130 / 1) x 500 = **65.000 points/turn** or **180.5555 points/deg**

ROLL: Encoder Resolution: 500 points Gear factors: 2868:20

Encoder output resolution: (2868 / 20) x 500 = **71700 points/turn** or **199.1666 points/deg**

Encoder output connector (SOURIAU 12Pin Female Panel UT001412SH)

A. ENC. A1+ PAN F.
B. ENC. A1- PAN F.
C. ENC. B1+ PAN F.
D. ENC. B1- PAN F.
E. ENC. A2+ TILT F.
F. ENC. A2- TILT F.
G. ENC. B2+ TILT F.
H. ENC. B2- TILT F.
J. ENC. A3+ ROLL F.
K. ENC. A3- ROLL F.
L. ENC. B3+ ROLL F.
M. ENC. B3- ROLL F.

Note: This is the point resolution. If the reading is by flank it needs to be multiplied by 4. If the reading is by level needs to be multiplied by 2.

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.FI.2	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 30/06/2020*

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