



GeoVISION™

Deluxe Borehole Video System User's Manual

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Introduction

Thank you for purchasing an Allegheny Instruments, Inc., GeoVISION™ Borehole Video System. Allegheny Instruments is committed to providing the world's highest quality borehole video systems along with the industry's best warranty and technical support. If you have any questions regarding your GeoVISION™ system, please contact us. Our office hours are Monday through Friday, 8:00 am to 5:00 pm Eastern Time and our contact information is as follows:

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Terminology

This manual uses the following conventions to highlight the presence of hazards, potential risk and important information concerning the operation and maintenance of this system.

DANGER: Denotes an imminently hazardous situation which, if not avoided, can result in death or serious injury.

WARNING: Denotes the presence of a condition that can cause significant personal injury and/or property damage and may void the product warranty if ignored.

CAUTION: Denotes the presence of a condition that can cause personal injury and/or property damage.

Note: Indicates supplemental information worthy of attention.

Be sure to follow all instructions and related precautions. They are intended for your safety and protection.

Foreword

This manual is to be used as a guideline for operation and maintenance of a GeoVISION™ Deluxe Borehole Video System. It is divided into six sections for easy reference.

Section 1 – Quick Setup Guide

Section 2 – System Setup

Section 3 – System Operation

Section 4 – Maintenance

Section 5 – Troubleshooting

Section 6 – Appendices

Important Precautionary Information

The information contained on this page appears throughout this manual. Be sure to read and understand these precautions prior to using the system.

DANGER

This system is not designed for use in explosive atmospheres.

WARNING

The GeoVISION™ Deluxe Winch and Control Panel are not waterproof; both parts should be protected from water and moisture. Exposure to excessive moisture can cause a safety hazard and/or system failure. If these components are exposed to water, power to the system should be removed, the power supply panel should be removed from the winch, and the components should be dried immediately.

Failure to clean and dry system components before placing them in the carrying case can cause premature failure and void the warranty.

If the interior of the carrying case is damp or wet, it should be allowed to dry thoroughly before the case is closed.

WARNING

This system must be powered from an AC sine wave power source such as a generator, commercial power, or a pure sine wave inverter.

WARNING

Never support a camera by the 3-pin connector. Always use the camera's built in clamp, if it has one, or use a Cable Support Clamp.

CAUTION

Before using the system, be sure that the "Camera Select" switch is in the correct position for the camera you are using. Refer to figure #6A.

CAUTION

This system is designed for use in potable water wells. It should not be used in environments where the plastic components

will come in contact with solvents, oils, or fuels. Solvents, oils, or fuels can damage plastic components and be absorbed into the plastic, allowing contaminants to be transferred from one well to another.

CAUTION

Chemical damage is not covered by the warranty.

CAUTION

If the system is used in salt water, all submerged electrical connections must be protected using silicon grease. Coat both the pins on the male connector(s) and the contacts on the mating connector(s) with grease. The connectors must be cleaned with fresh water and dried after each such use. Damage from use in salt water is not covered by the warranty.

CAUTION

Plastic cameras should not be subjected to thermal shock. If a plastic camera is very cold, it should be allowed to warm to the borehole temperature in air before it is placed in the bore. If a plastic camera is hot, it is best to turn the camera off for about 5 minutes inside the borehole, before it is submerged. Damage resulting from thermal shock is not covered by the warranty.

CAUTION

The operating temperature range for plastic cameras is 32° F (0° C) to 100° F (37° C). Use of plastic cameras in temperatures outside this range can damage the camera and is not covered by the warranty.

CAUTION

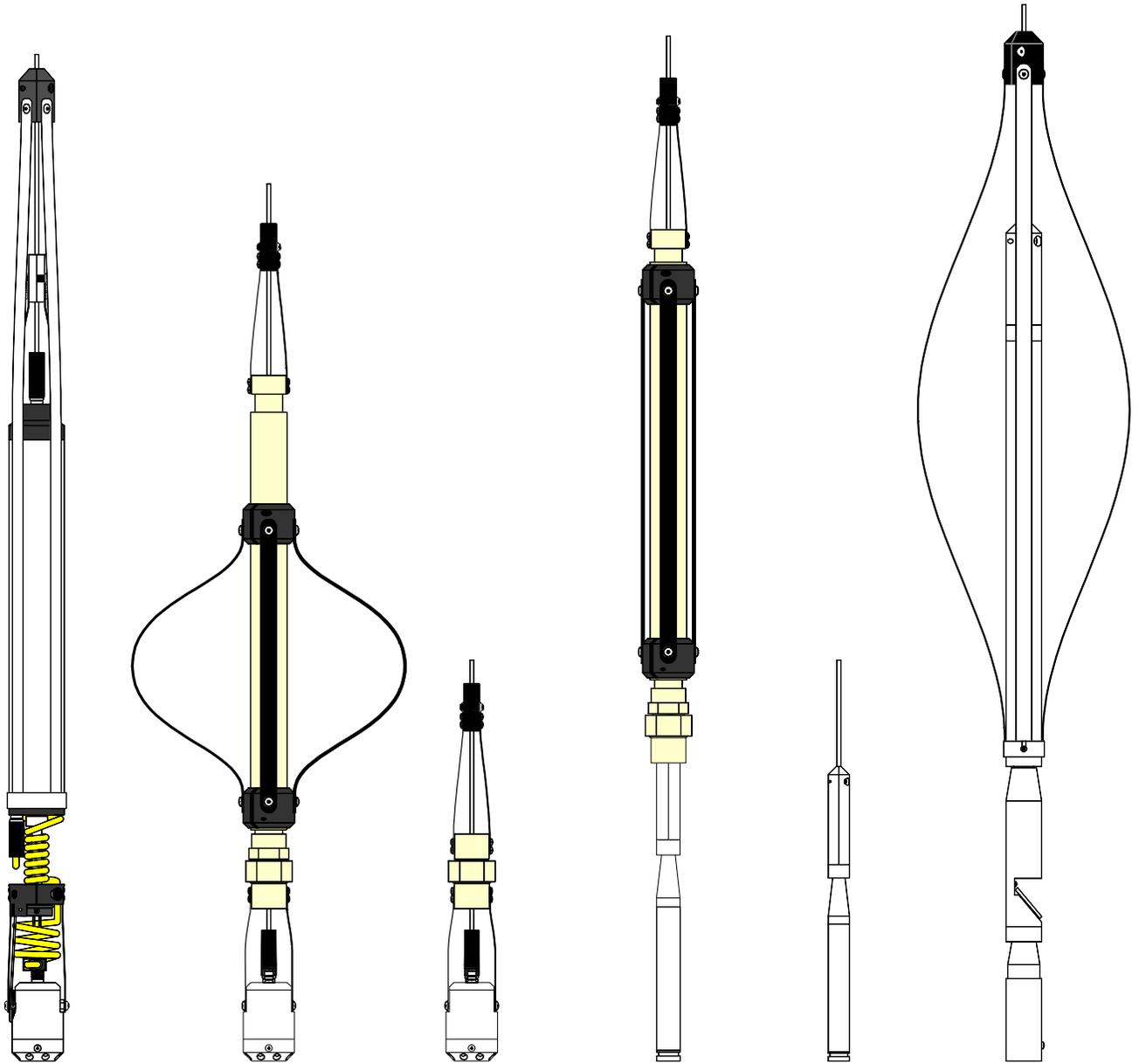
Plastic cameras will warp and leak if operated or stored at temperatures above 120° F (49° C). Temperature warped cameras are not covered by the warranty.

Quick Setup Guide

Camera Configuration

The following image illustrates some common ways to configure various cameras based on the type of camera, bore diameter and intended use. For a detailed description on how to configure each camera, see the appendix for the camera.

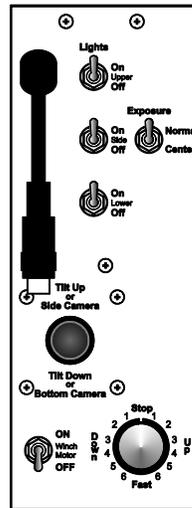
Typical Camera Configurations



Winch Setup

Set the switches on the top of the Control Panel.

Turn on all three light switches.



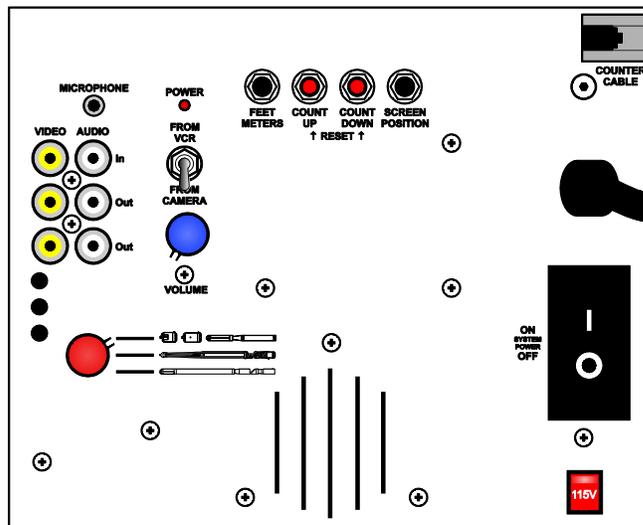
Set the Exposure Control switch to “Normal.”

Turn off the Winch Motor switch.

Rotate the Winch Control knob straight up to the “Stop” position.

Set the switches on the side of the Control Panel.

Set the Video Source switch to “FROM CAMERA.”



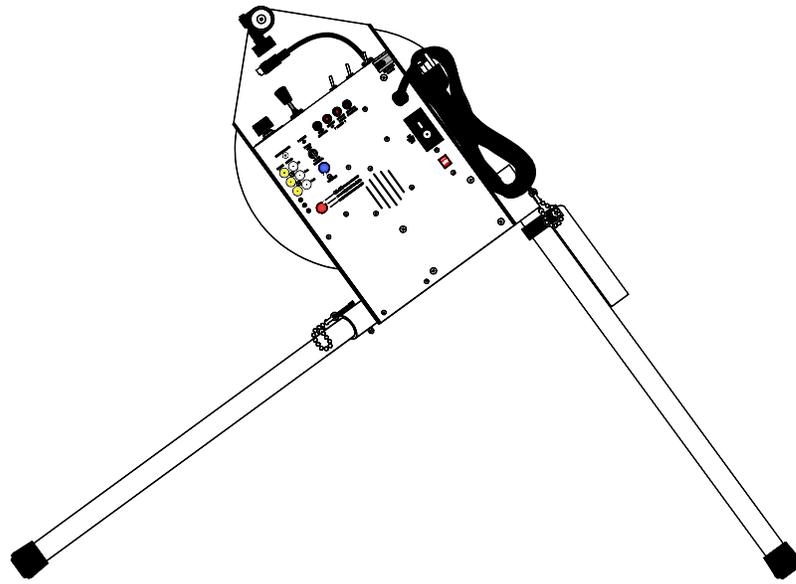
Turn the Volume knob all the way down.

Turn off the System Power switch.

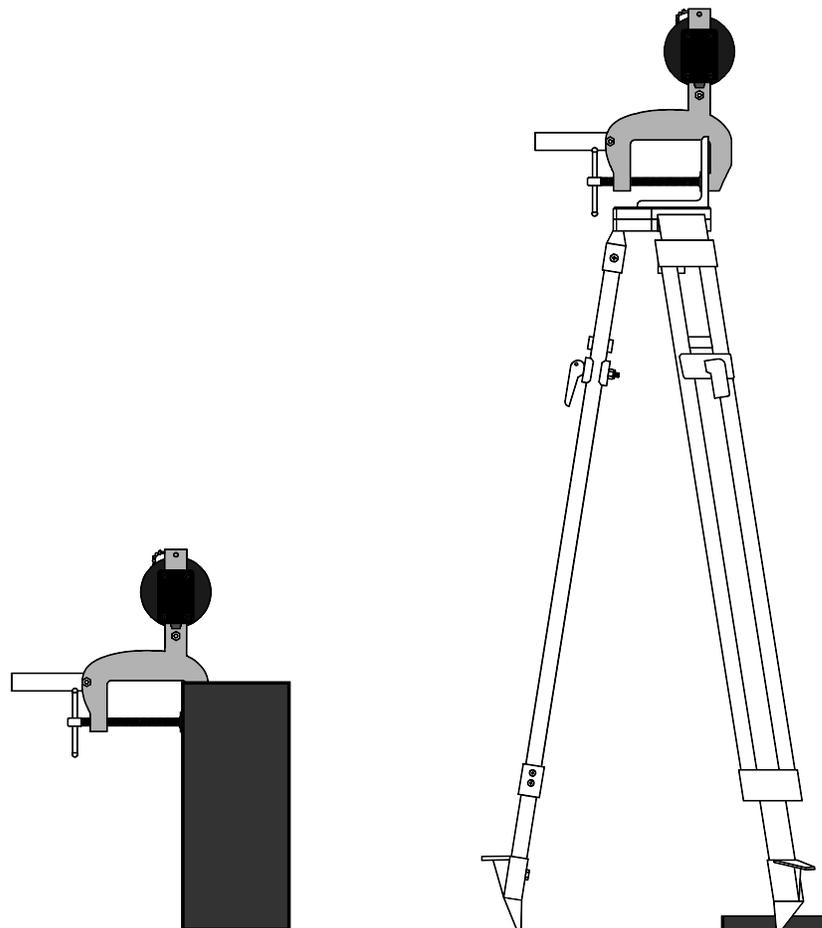
Set the Camera switch for the camera you are using.

Set the Input Voltage switch for the proper source voltage, 115V or 230V.

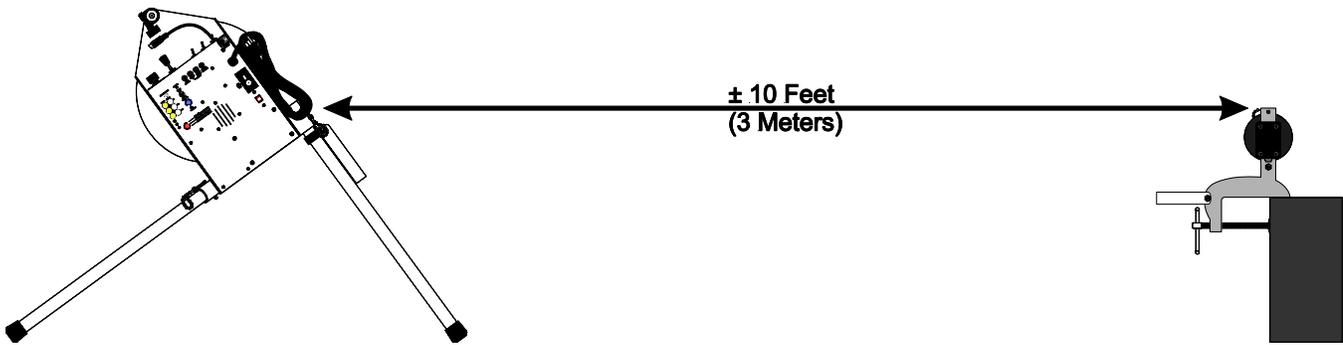
Insert the winch legs.



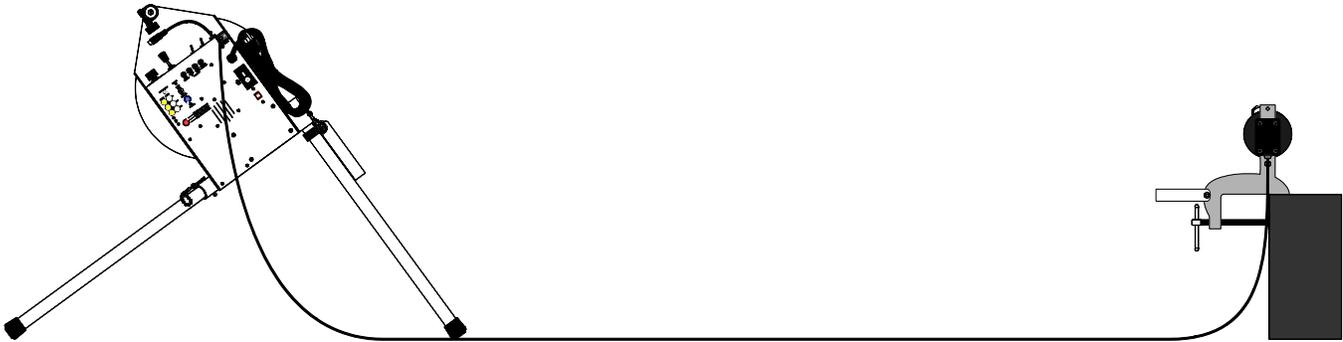
Clamp the Depth Encoder to the well casing or a tripod placed over the bore.



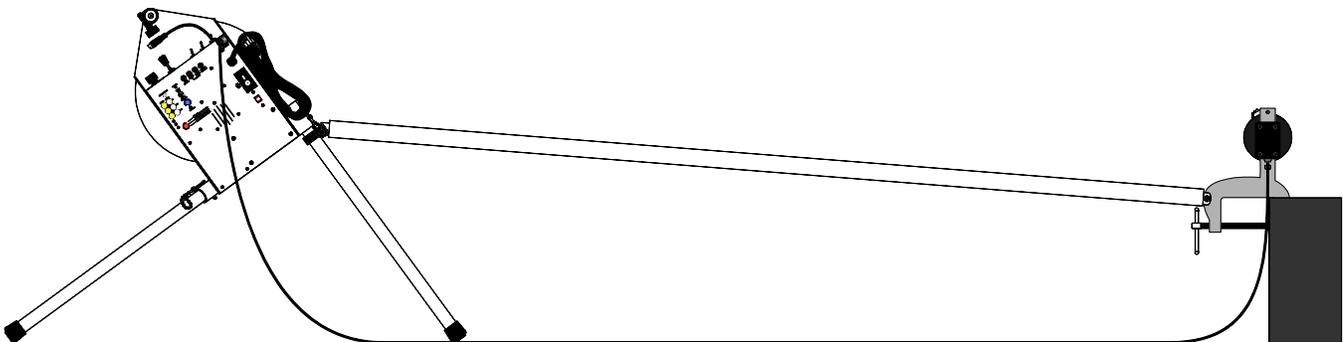
Place the winch on level ground approximately 10 feet (3 meters) from the Depth Encoder.



Connect the Encoder Cable between the winch and the Depth Encoder.

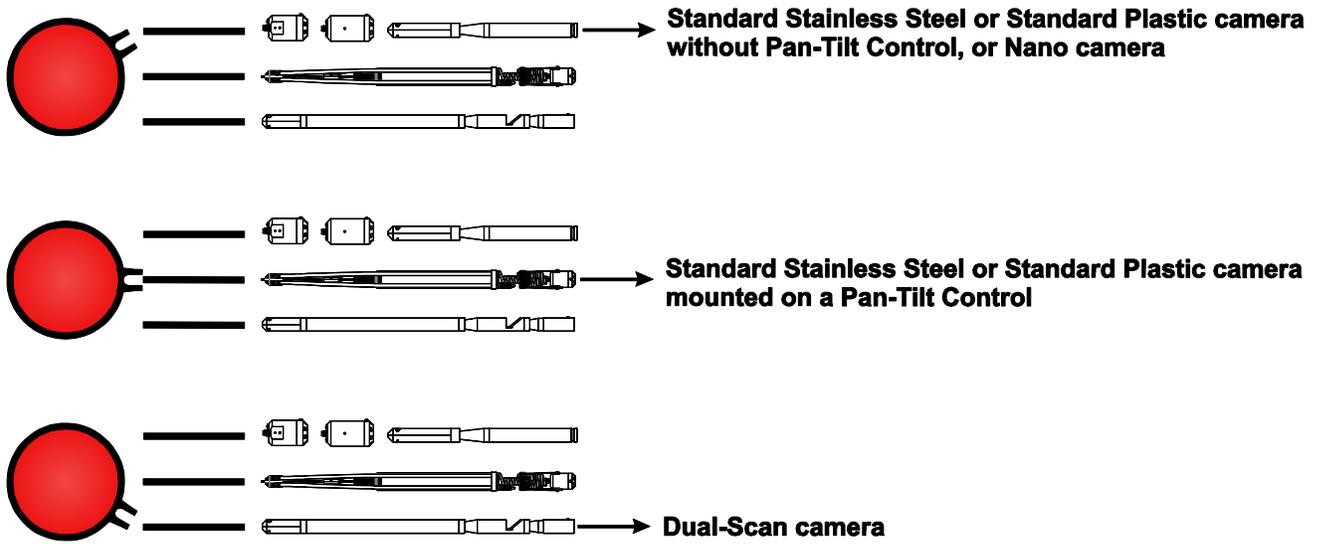


If the borehole is deeper than 600 feet (200 meters), we recommend placing a spacer pipe between the winch and the Depth Encoder.

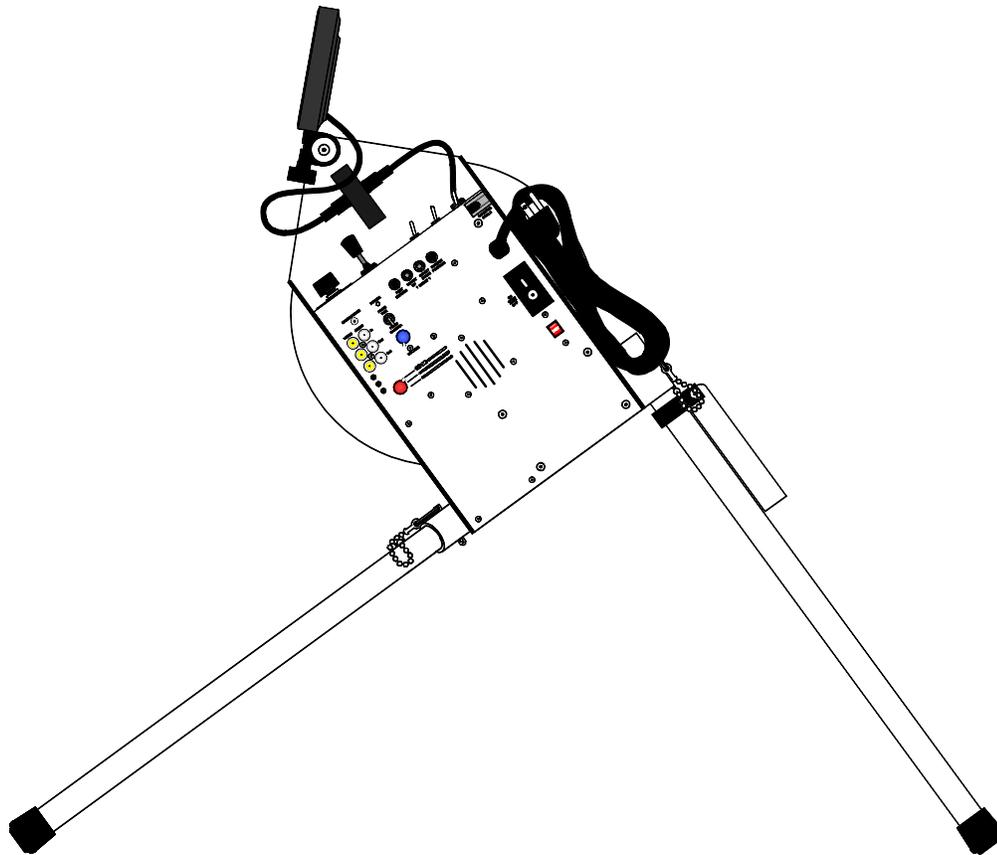


- Plug in the winch and turn on the System Power switch.
- With the Winch Control knob in the “**Stop**” position, turn on the Winch Motor switch.
- Turn the Winch Control knob counterclockwise toward “**Down**” and spool off enough cable to reach approximately 3 feet (1 meter) beyond the Depth Encoder.
- Turn off the Winch Motor switch and, if necessary, return the Winch Control knob to the “**Stop**” position.

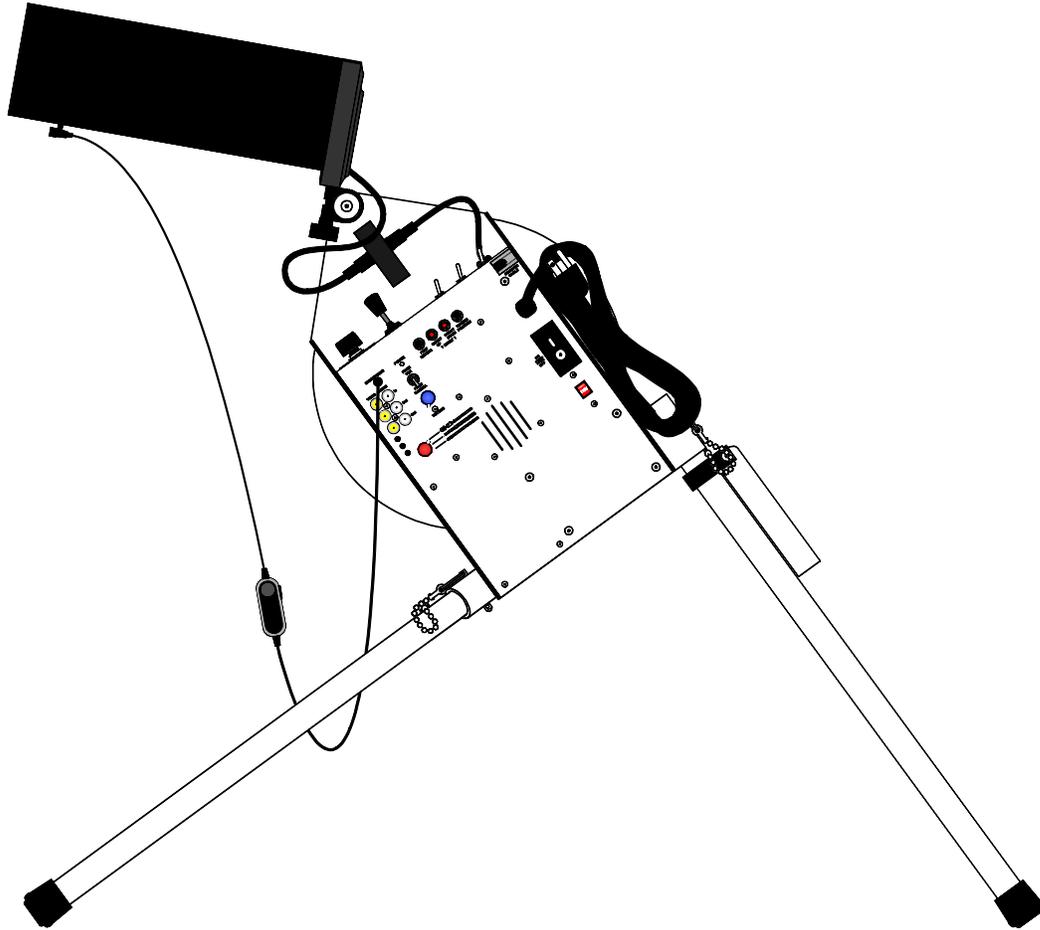
Set the Camera switch for the camera you are using and attach the camera to the winch cable.



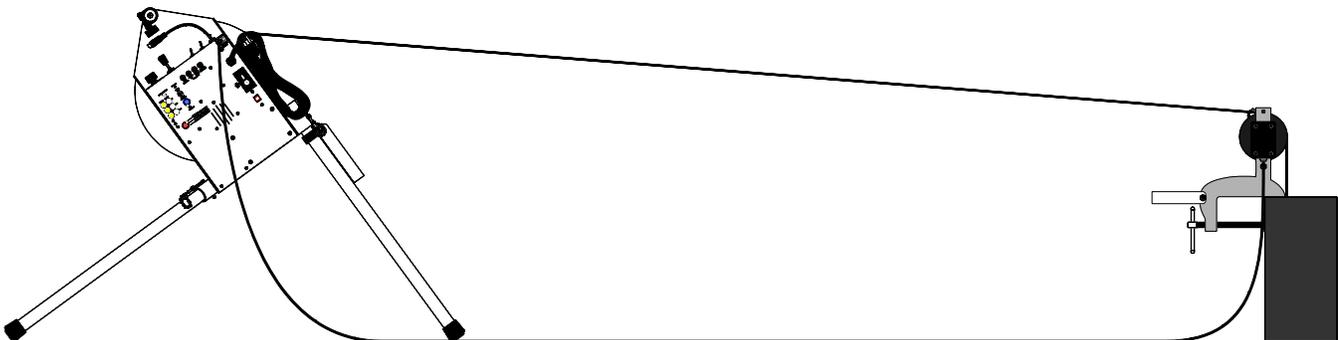
Mount the monitor on the winch.



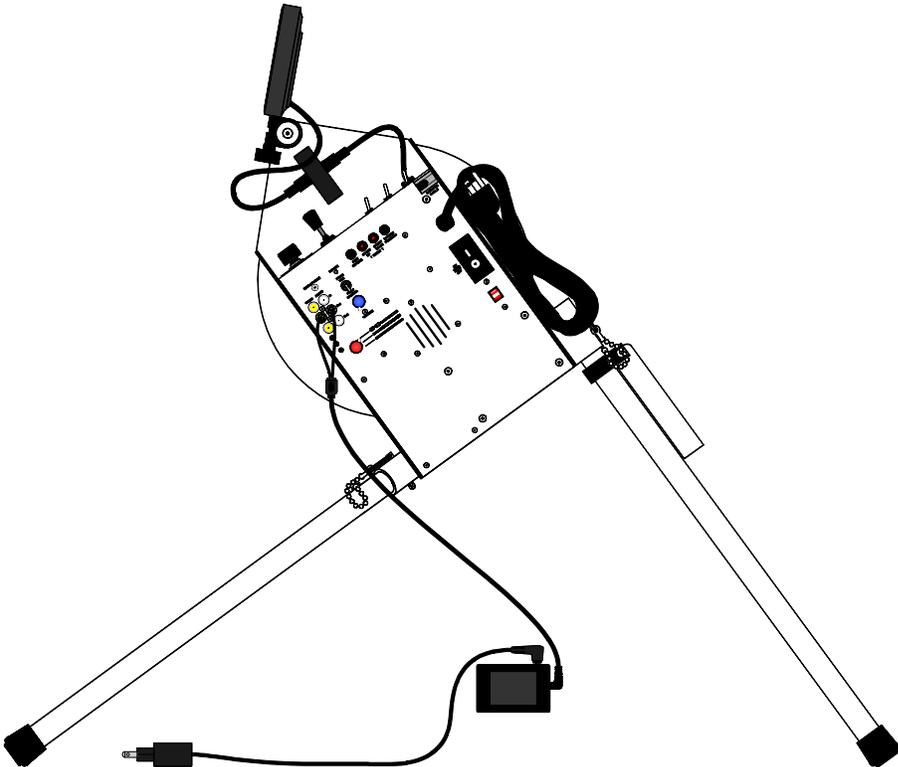
If glare makes viewing the monitor difficult, attach the Sunshade to the top of the monitor. A microphone can also be attached to the hole in the Sunshade.



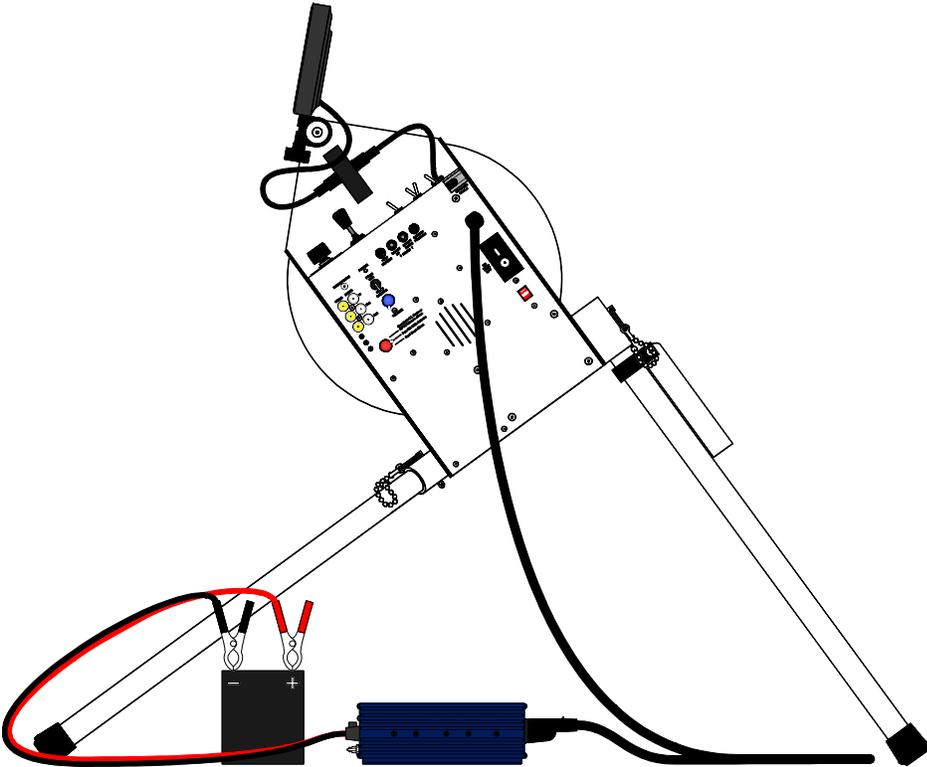
Lower the camera into the bore, place the winch cable over the Depth Encoder pulley, and secure it in place with the pin.



If desired, connect a video recorder.



If desired, connect a true sine wave inverter to a battery or a vehicle and plug the winch into the inverter.



System Setup

Install the Tripod Legs

- This step is easier if the winch is placed on an elevated surface with the rear leg sockets hanging over the edge. The carrying case makes an acceptable work surface for this purpose.
- Insert the two rear tripod legs into their mating sockets. The rear legs are the two identical ones and do not have a brace pole bracket attached to them.
- Insert the quick release pins to lock the legs in place.
- Lift the winch by its handle and rock it back so that the two rear legs are on the ground and supporting the weight of the winch.
- Insert the front tripod leg with the brace pole attachment bar facing away from the winch spool and insert the quick release pin.
- Lower the winch so that it is supported by all three legs.

Locate the Winch

- Place the winch approximately 10 feet from the borehole keeping it as level as possible.
- Remove enough cable from the winch to allow the end of the cable to extend 3 feet beyond the borehole.

Check the Winch Switches

- Check that the Voltage Select switch is set to the voltage you will be using, 115 or 230 volts AC.
- Check that the System Power switch is turned off.
- Check that the Winch Motor switch is turned off.
- Check that the Winch Control knob is set to “0” or “Stop.”
- Check that the Camera switch is set to the camera you will be using.
- Check that the Video Source switch is set to “FROM CAMERA.”
- Check that all three light switches are turned on.
- Check that the Exposure Control switch is set to “Normal.”

Install a Brace Pole

- If you are logging deeper than 600 feet, it is recommended that you install a brace pole between the winch and the Depth Encoder using the aluminum brackets attached to each.

Install the Depth Encoder

- Attach the Depth Encoder to either the well head or to a tripod positioned over the well.
- Connect the grey telephone cord between the winch and the Depth Encoder. Note that the ends of the cord are different; the wide connector plugs into the Depth Encoder, and the narrow connector plugs into the winch.

Attach the Monitor

- If you purchased a monitor with your system, follow these steps to mount it to the winch.
- Thread the bolt on the monitor mount into the hole on the bottom of the monitor, just enough to engage the threads.
- Position the monitor so it faces the operator, and tighten the bolt to lock the monitor in position.
- Plug the monitor into the mating cord on the Control Panel.
- If glare makes it difficult to see the monitor, attach the Sunshade to the monitor using the Velcro™ strips along the top of both the monitor and the Sunshade.

Connect a Microphone

- If your microphone requires a battery, be sure that the battery is installed correctly.
- If you purchased a monitor with your system, you can use a small microphone clip to attach the microphone to the hole in the Sunshade, so that the microphone is mounted to the outside of the Sunshade facing the operator.
- Plug the microphone into the jack labeled “MICROPHONE” on the Control Panel.

Set Up the Camera

- Each camera can be configured in a number of ways, depending on the size of the bore. Refer to the Appendix that covers the camera you are using for complete setup instructions. Appendices for the cameras are as follows:

Appendix B – Standard Stainless Steel Cameras

Appendix C – Standard Plastic Cameras

Appendix D – Nano Camera

Appendix E – Dual-Scan Camera

Place the Camera in the Bore

- Remove the retaining pin from the top of the Depth Encoder.
- Place the camera in the bore and lay the winch cable over the Depth Encoder pulley. Make sure there is no twist in the cable between the winch and the Depth Encoder.
- Replace the retaining pin in the Depth Encoder.

System Operation

Initial Settings

- Check that the Voltage Select switch is set to the voltage you will be using, 115 or 230 volts AC.
- Check that the System Power switch is turned off.
- Check that the Winch Motor switch is turned off.
- Check that the Winch Control knob is set to “0” or “Stop.”
- Check that the Camera Select switch is properly set for the camera attached to the cable.
- Check that the
- Video Source switch is set to “FROM CAMERA.”
- Turn on all three light switches.
- Set the Exposure Control switch to “Normal.”
- Turn on the System Power switch.

Testing and On-Screen Depth Display (OSD) Initialization

- Press the “Screen Position” button repeatedly until you see the OSD numbers on the screen and in the position you desire.
- Rotate the Winch Control knob so that it points straight up in the “0” position.
- Turn on the Winch Motor switch.
- Slowly turn the Winch Control knob counterclockwise to lower the camera into the bore. Turn the knob back to “0” or turn off the Winch Motor switch to stop the winch.
- When the camera reaches the depth that will serve as the reference depth, press and hold the two red buttons to zero the OSD count.
- Now is a good time to test the winch controls. If you are using a Dual-Scan Camera or a Pan-Tilt Control, test that the joystick is controlling the camera properly and that the exposure control is functioning correctly. Check that the light(s) is(are) working properly as well.
- If you plan to record the session, now is the time to make a short recording (including audio if desired) and to play it back to be sure everything is working correctly. For more information on connecting a video recorder, see Appendix A.

Logging the Bore

- Use the Winch Control knob to lower the camera down the bore. If the camera is going to be submerged, keep in mind that the first trip down will see the least amount of sediment. It is often best to record video on this pass.
- In an emergency, the Winch Motor switch or the System Power switch can be used to stop the winch; however, using the Winch Control knob rather than the switches reduces wear and tear on the motor.
- Turning off the System Power switch does not reset the OSD count; however, if the cable is spooled out or in while the power is off, the change will not be reflected in the OSD count when power is restored.
- When lowering into a bore for the first time, it is always a good idea to look straight down the bore. If you are using a Dual-Scan Camera or Pan-Tilt Control and would like to look sideways, it is a good idea to stop the winch before doing so.

Retrieving the Camera

- When raising the camera out of the bore, it is very important to dry the cable and wind it neatly on the winch. Paper towels are an effective way to dry the cable. Hold the cable in the fold of several paper towels as you guide the cable neatly onto the winch. After use, the paper towels can be discarded to reduce the risk of cross contamination of wells.

WARNING

The GeoVISION Deluxe Winch and Control Panel are not waterproof and should be protected from water and moisture. Exposure to excessive moisture can cause a safety hazard and/or system failure. If these components are exposed to water, power to the system should be removed immediately, the Control Panel should be removed from the winch, and the components should be dried thoroughly.

Failure to clean and dry system components before placing them in the carrying case can cause premature failure and void the warranty.

If the interior of the carrying case becomes damp or wet, all items should be removed from the case, and it should be allowed to dry thoroughly before it is used again.

Maintenance

Camera

- After each use, flush the 3-pin connector on the rear of the camera with clean, fresh water. When the connector is dry, lightly coat the pins with silicone grease and cover the connector with one of the yellow nylon caps to protect it from dirt.
- Occasionally check for a buildup of silicone grease inside the 3-pin connector. If a buildup occurs, gently remove it before cleaning.

Winch Cable

- Always use one hand and a clean rag or paper towels to guide the cable back onto the winch when retrieving the camera. Wind the cable in neat rows to ensure that all of the cable fits back on the winch; this also helps you locate damaged sections in the cable. Wiping the cable clean and dry extends the life of the cable and helps prevent cross contamination between wells.

Control Panel

- The Control Panel should be kept clean and dry. If the foam in the case becomes damp, remove it from the case and allow it to dry thoroughly before repacking the case.

Troubleshooting

Symptom	Solution
Power LED does not light.	Check that the input voltage is between 115 and 230 VAC. Turn the System Power switch on the Control Panel off and then back on; the switch is also a circuit breaker and this resets the breaker.
Camera lights do not turn on and there is no video on the monitor.	Check that the power LED on the Control Panel is lit; if not, see above. Check that the modular telephone cord between the winch and the Control Panel is in place and firmly attached at both ends. Check that the winch cable is firmly connected to the camera, finger tight only. Check that all three light switches are turned on. Check that the Video Source switch is set to “FROM CAMERA.” If you have a 7-inch GeoVISION™ monitor, check the condition of the 5 pins in the Control Panel’s monitor cable plug and then ensure that the monitor is firmly plugged into this cable. If you are not using a GeoVISION™ monitor, consult the manual for the monitor to ensure that the monitor is correctly configured for composite video input.
Camera lights are on but there is no video on the monitor.	Check that the Video Source switch is set to “FROM CAMERA.” If you have a 7-inch GeoVISION™ monitor, check the condition of the 5 pins in the Control Panel’s monitor cable plug and then ensure that the monitor is firmly plugged into this cable. If you are not using a GeoVISION™ monitor, consult the manual for the monitor to ensure that the monitor is correctly configured for composite video input and check that the monitor is connected to one of the two “Video Out” jacks on the Control Panel.
No video is being recorded.	Check that the recorder accepts NTSC Composite video. Check the cable connections between the recorder and the Control Panel as described in Appendix A.
No audio is being recorded.	Check that the recorder accepts line level audio. If the microphone uses a battery, check and replace it if necessary. Check the cable connections between the recorder and the Control Panel as described in Appendix A. If you are listening to the audio through the speaker in the Control Panel, check that the volume knob is not set too low.
Audio is recorded but the level is low.	If the microphone uses a battery, check and replace it if necessary. Check the cable connections between the recorder and the Control Panel as described in Appendix A. If you are listening to the audio through the speaker in the Control Panel, check that the volume knob is not set too low.
On-Screen Depth is not displayed.	Did you purchase the OSD option with the system? Press the “SCREEN POSITION” OSD button several times. Check that the Video Source switch is in the correct position (usually this is the “FROM CAMERA” position).
On-Screen Depth does not change when the camera is raised or lowered.	Check that the modular telephone cable between the Depth Encoder and the Control Panel is installed correctly. Check that the Depth Encoder works properly by spinning the pulley by hand. If it works, clean the Depth Encoder pulley of grease and oil to prevent the cable from sliding across the friction tape. Never oil the Depth Encoder bearings.
Video image is not in sharp focus.	Check that the window on the front of the camera is clean. If the water in the bore has a surface coating of oil that is coating the window, place dishwashing soap on the window and quickly lower the camera through the oil. Once through, raise and lower the camera in the water to rinse

	off the soap.
“Noise” in the video image.	<p>Check that you are using a 3 wire power source. All 3 pins on the power cable must be connected in order to eliminate noise.</p> <p>Try a different power source such as an inverter connected to a battery.</p> <p>If there is a running pump in the well, turn it off.</p> <p>If you are using a generator, try grounding it to a copper grounding rod driven into the ground.</p>
Camera turns on and off over a period of 1 to 5 minutes.	<p>Check the voltage at the camera using a Voltage Setting Cable. When the cable is installed between the winch cable and the camera, the voltage should read 11.5 VDC \pm 0.2 volts. Adjust the voltage if necessary.</p>

If the solutions given above do not resolve your issue, please contact Allegheny Instruments in one of the following ways.

(800) 343-3479

(540) 468-3740

Repair@AlleghenyInstruments.com

Allegheny Instruments, Inc.

Attn: Repairs

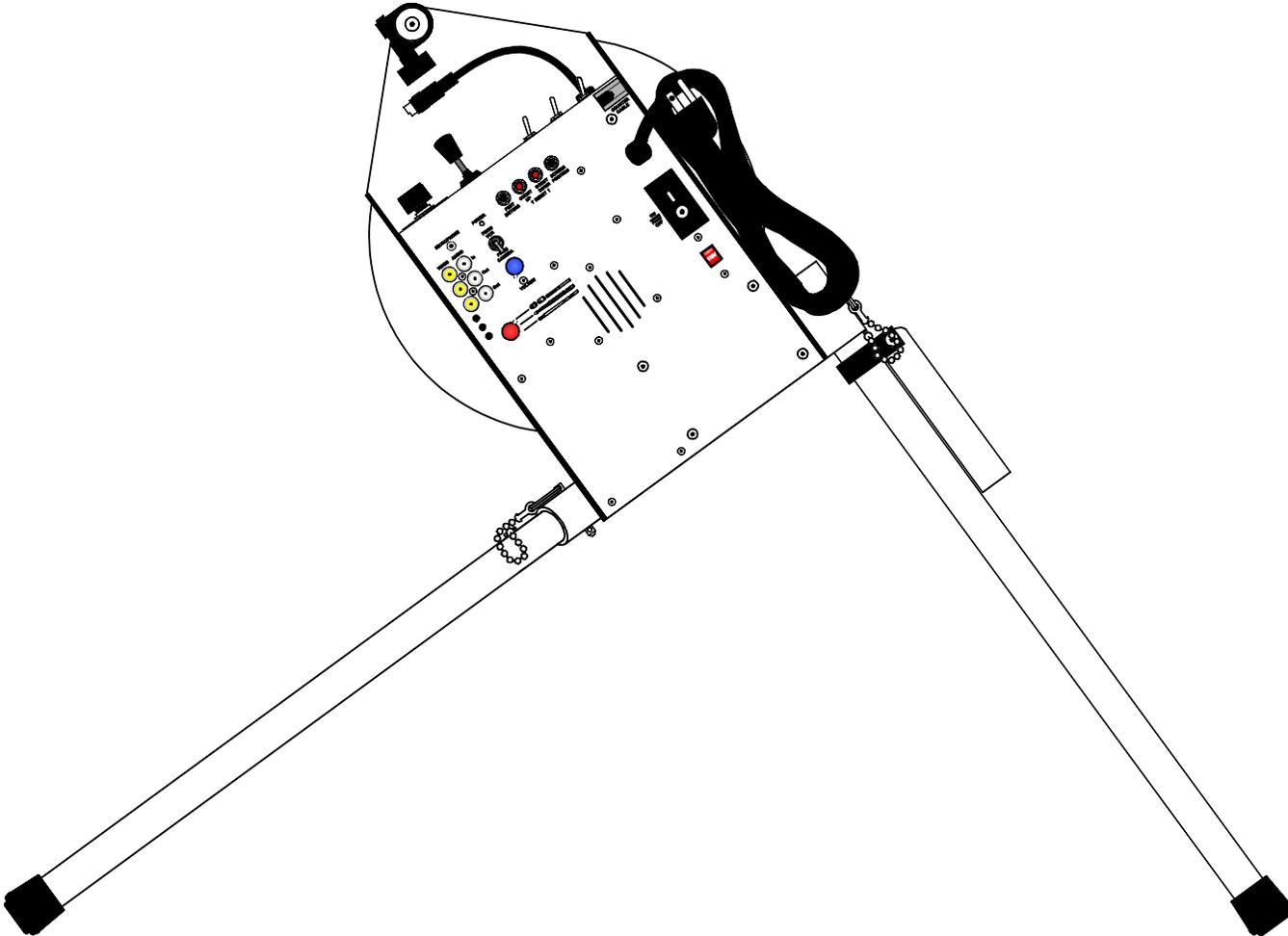
1509 Jackson River Road

Monterey, VA 24465 USA

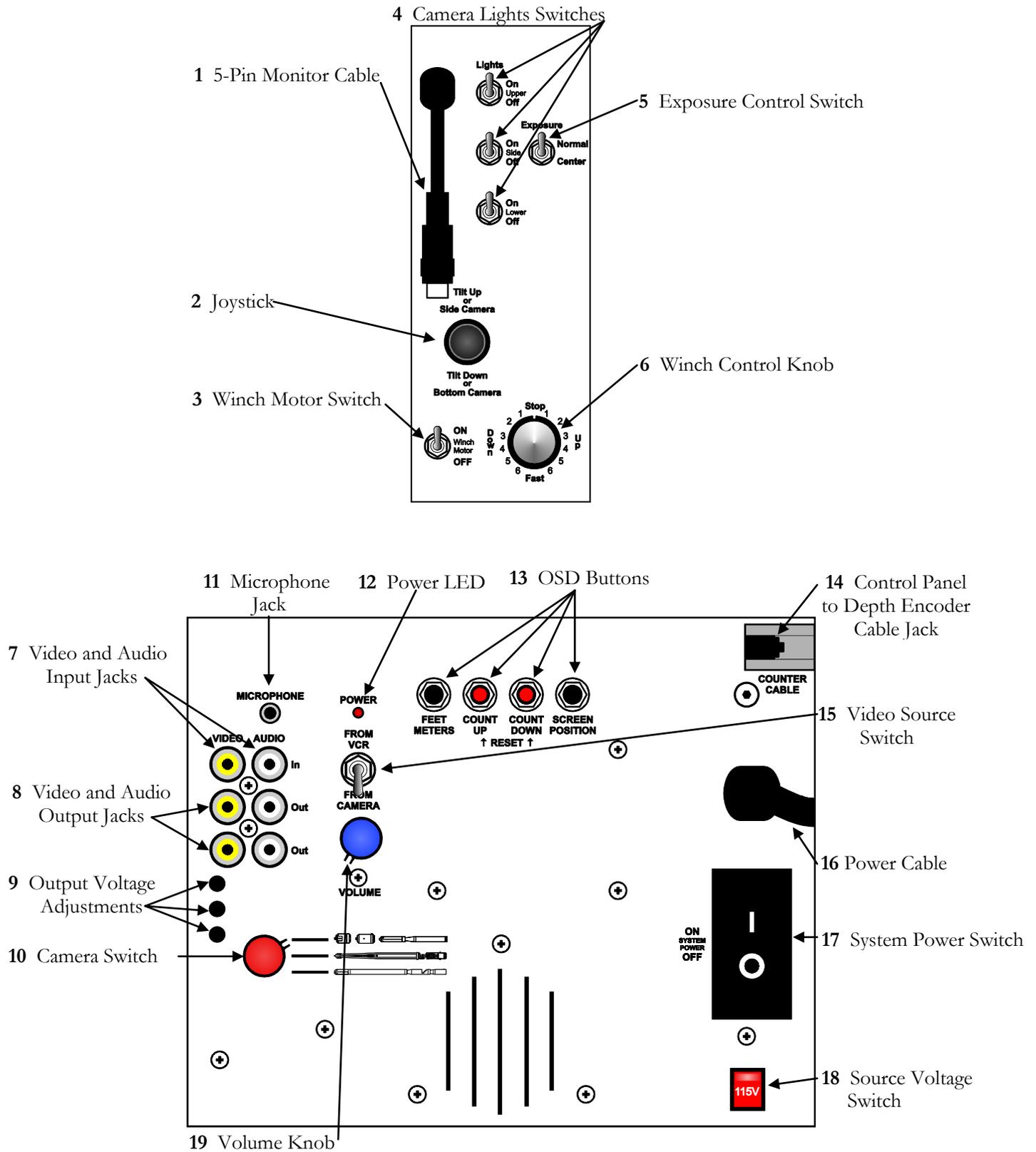
Our office hours are Monday – Friday, 8:00 am to 5:00 pm Eastern Time.

Appendix A

Deluxe Winch



Deluxe Winch Control Panel



1. 5-Pin Monitor Cable

This cable is proprietary and provides power and video to a GeoVISION™ monitor. This cable looks similar to an S-Video cable but it is not. Plugging an S-Video cable into this cable could cause damage to the Control Panel, as well as to the device attached to the S-Video cable.

2. Joystick

The joystick is used to pan and tilt a camera attached to a Pan-Tilt Control or to pan and switch between cameras when controlling a Dual-Scan Camera.

3. Winch Motor Switch

The Winch Motor switch enables or disables the winch motor. It is used in conjunction with the Winch Control knob. In an emergency, it can be turned off to stop the winch motor; however, it is preferable to use the Winch Control knob to start and stop the winch motor.

4. Camera Lights Switches

When connected to a Dual-Scan Camera, the “**Upper**” light switch turns the 9-LED ring-light above both cameras on and off. The “**Side**” light switch turns the side facing 3-LED light on and off. The “**Lower**” light switch turns the 9-LED ring-light between the two cameras on and off.

When connected to a Standard camera with or without a Pan-Tilt Control, only the “**Lower**” light switch is enabled. It turns the camera’s LED lights on and off.

When connected to a Nano Camera, none of the three switches are enabled.

5. Exposure Control Switch

A Standard Stainless Steel Camera attached to a Pan-Tilt Control and Dual-Scan cameras can switch between two exposure modes. When the Exposure Control switch is in the “**Normal**” position, the camera exposure is set based on the average brightness of the entire image. When the Exposure Control switch is in the “**Center**” position, the camera exposure is set based on the brightness of the center portion of the image. This feature allows you to view into holes and voids in the bore wall. If the image from the camera appears to be too bright, it may be because this switch is in the “**Center**” position.

6. Winch Control Knob

This knob is used in conjunction with the Winch Motor switch. The knob only works when the Winch Motor switch is turned on. Always be sure that this knob is pointing straight up in the “**Stop**” position before turning on the Winch Motor switch.

Rotate the Winch Control knob counterclockwise to spool cable off the winch and lower the camera down the bore. The farther counterclockwise the knob is rotated, the faster the winch turns. Rotate the knob back up to the “**Stop**” position to slow and stop the winch motor.

Rotate the Winch Control knob clockwise to spool cable onto the winch and raise the camera up the bore. The farther clockwise the knob is rotated, the faster the winch turns. Rotate the knob back up to the “**Stop**” position to slow and stop the winch motor.

7. Video and Audio Input Jacks

These jacks are used to connect the Control Panel to the composite video and line level audio output from a video recorder. This allows the user to preview recorded video and audio on the system monitor and through the system speaker. In order to view the recorded material, the Video Source switch must be in the “**FROM VCR**” position. Note that not all video recorders provide video and audio output. In this event, another method must be used to view recorded content, such as playing back the video on the recording device.

8. Video and Audio Output Jacks

These jacks are used to provide composite video and line level audio output. The upper video and audio out jacks are used to connect a recording device, and the bottom video and audio out jacks are for an additional video monitor. If no recording device is used, video monitors can be connected to both sets of output jacks. To loop video through a recording device, connect the “**Video Out**” and “**Audio Out**” on the recorder to the “**Video In**” and “**Audio In**” jacks on the Control Panel. Then connect the “**Video In**” and “**Audio In**” jacks on the recorder to

the upper “**Video Out**” and “**Audio Out**” jacks on the Control Panel. Place the Video Source switch in the “**FROM VCR**” position. Now the camera video and microphone audio are sent to the recorder; the recorder then sends the video and audio back to the Control Panel where it is displayed on the monitor and through the speaker.

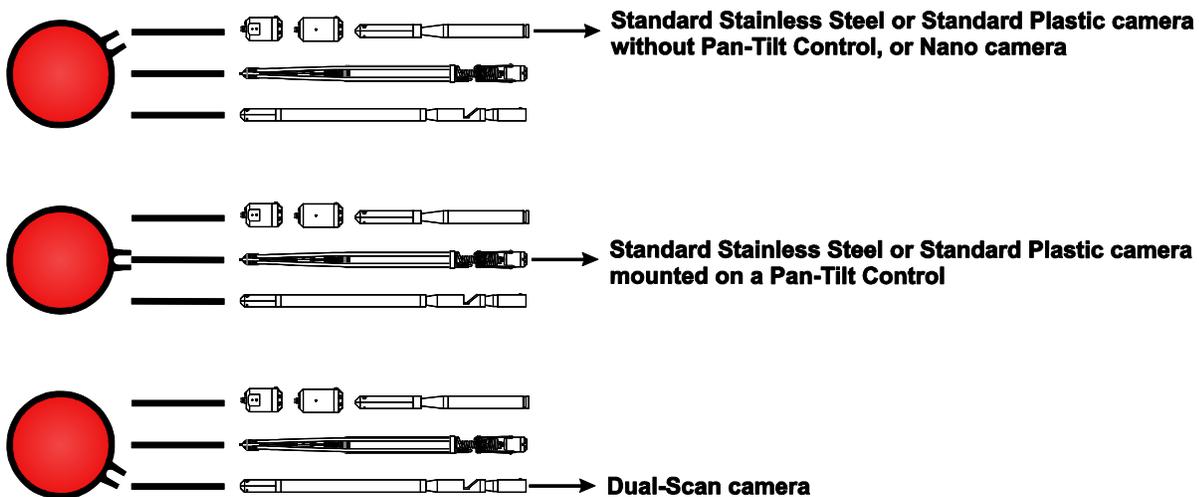
9. Output Voltage Adjustments

In the event that a length of cable must be removed from the winch, it may be necessary to adjust the output voltages of the Control Panel. A clear indication that this is the case is when a camera connected to the winch works fine for a period of time, then turns off for a few minutes and then turns back on and repeats the process. In this event, a “Voltage Setting Cable” must be purchased so that the camera can be connected to the end of the cable while the voltage is measured and adjusted.

10. Camera Switch

It is critical that the Camera switch is correctly set for the camera you are using. If it is not set correctly, camera controls such as light switches and the joystick may yield unpredictable results. If a Standard camera without a Pan-Tilt Control or a Nano Camera is connected to the winch and this switch is not set to “**Standard SS, Nano or CPVC Camera Alone**”, the camera will turn on and off indefinitely.

The below image illustrates how to correctly set the Camera switch.



11. Microphone Jack

This jack allows a microphone to be connected to the system so that audio can be recorded along with video. It is important to note that not all microphones are the same. Some microphones (often those designed for use with computers) output extremely low signals. These microphones will not work with this system. It is important to test a microphone before it is used. Simply plug the microphone into the jack, turn on the control panel, talk into the microphone, and adjust the volume until you hear your voice in the speaker. If the audio from the speaker is too low, try a different microphone. A good rule of thumb is that if the microphone has a battery, it will probably work with the system.

12. Power LED

The Power LED simply lights when the Control Panel is turned on. If the LED does not light, turn the system off, unplug it, check and replace the fuse if necessary. If the Power LED still does not light, contact Allegheny Instruments.

13. OSD Buttons

The OSD buttons are used to change the unit of measure between feet and meters, to reset the count to zero, to increase or decrease the count, to change the position of the count on the screen, and to hide the count.

The “**FEET METERS**” button switches the OSD unit of measure between feet and meters. The precision of the count is either 1/10 foot or 1/10 meter, depending on the unit of measure.

The “**COUNT UP**” button increments the count by 1/10 of a foot or meter. Hold the button down for 10 seconds to increase the speed at which the count is incremented.

The “**COUNT DOWN**” button decreases the count by 1/10 of a foot or meter. Hold the button down for 10 seconds to increase the speed at which the count is decreased.

Press both the “**COUNT UP**” and “**COUNT DOWN**” buttons simultaneously for 1 second to reset the count to zero.

The “**SCREEN POSITION**” button changes the location of the count on the screen. The count can be placed in each corner of the screen, as well as the center of the screen, and can be hidden from view. When the count is hidden from view, it is not turned off; it continues to count and will display the correct depth when it is made visible by pressing the “**SCREEN POSITION**” button again.

14. Control Panel to Depth Encoder Cable Jack

The Control Panel to Depth Encoder Cable Jack is where the modular telephone cord that connects the Control Panel to the Depth Encoder is plugged in. Note that this jack is slightly different from the jack in the Depth Encoder. The jack in the Depth Encoder is wide while this jack is narrow. Correspondingly, the plug on one end of the modular telephone cable is narrow to fit this jack while the plug on the other end is wide to fit in the Depth Encoder. This prevents the cable from being plugged in “backwards” and potentially causing damage to system components.

15. Video Source Switch

The Video Source switch allows the video from the camera to be viewed directly on the monitor or to be passed through a recording device before being displayed on the monitor. In the vast majority of cases, this switch will remain in the “**FROM CAMERA**” position. For information on passing video through a recorder, see number **8. Video and Audio Output Jacks**.

16. Power Cable

The Power cable is set up for North American 110 VDC at 60 Hz. In reality it can accept 110 – 240 VAC and a frequency range of 50 – 60 Hz. System power draw is 300 Watts or less depending on the configuration.

17. Power Switch

This switch supplies power to the Control Panel. When the switch is turned on, the Power LED should glow red. If the LED does not light, check the fuse and replace it if necessary and check that the Power cable is plugged into a working power source.

18. Source Voltage Switch

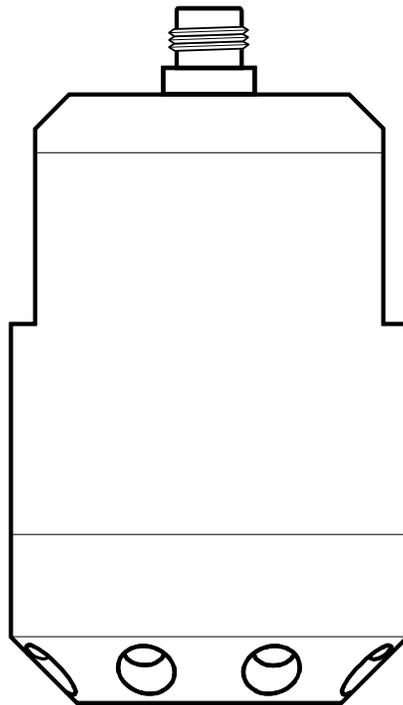
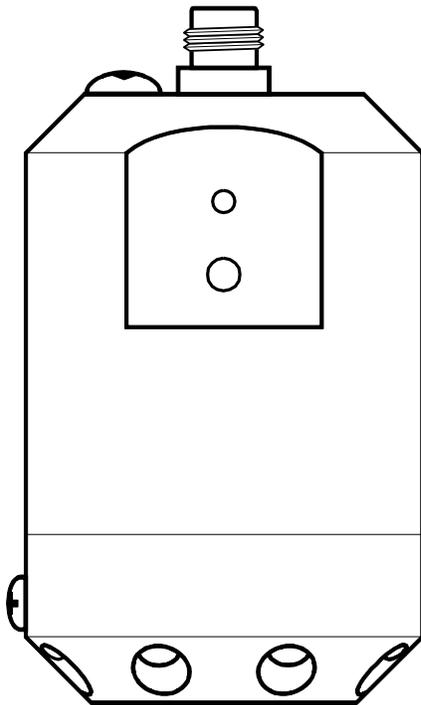
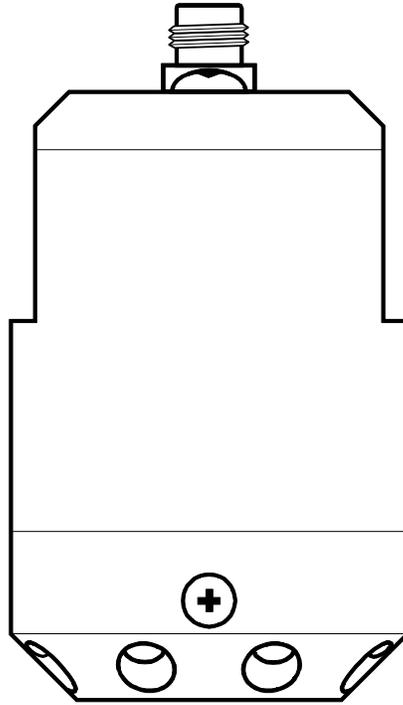
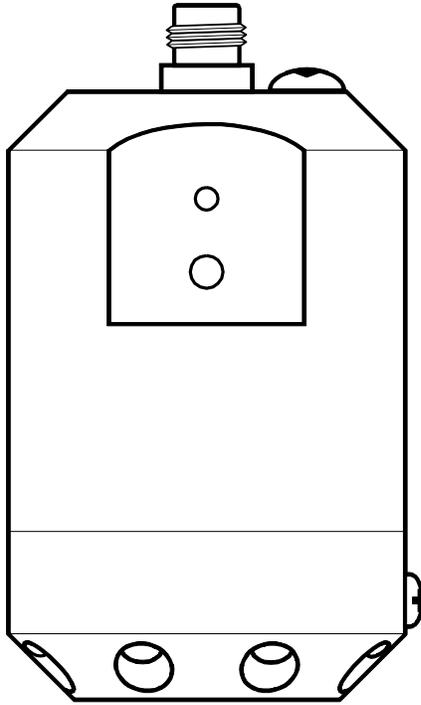
It is critical that the Source Voltage switch be set correctly. The Deluxe Winch will work with an input voltage of 115 VAC or 230 VAC. This switch must be correctly set or the system will be damaged and the damage is not covered by the limited warranty.

19. Volume Knob

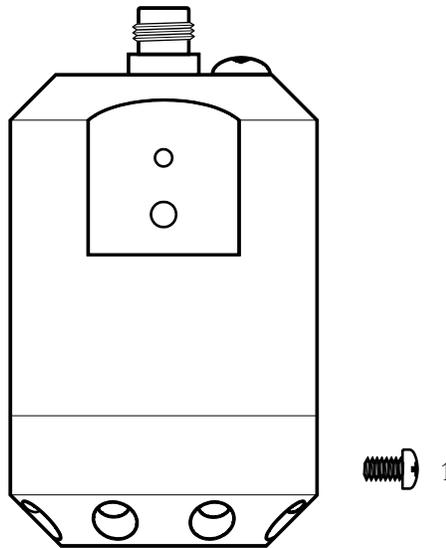
The Volume knob adjusts the volume of the speaker. It is useful to test that the microphone is working correctly and that the audio was indeed recorded with the video when played back through the system. For instructions on connecting a video recorder for playback through the Control Panel, see **8. Video and Audio Output Jacks**.

Appendix B

Standard Stainless Steel Cameras



Standard Stainless Steel Camera Exploded View



- 1) MP-0145 #4-40 x 3/16 Stainless Steel Screw

NOTE: The stainless steel #8 screw in the rear of the camera must never be removed. It is used during assembly and then the hole in the screw head is filled with epoxy. If this screw is removed or loosened, the camera will leak.

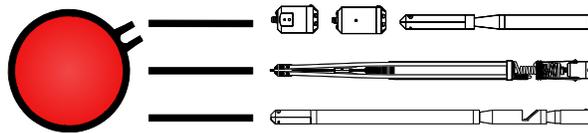
Overview

The Standard Stainless Steel camera is the workhorse of the GeoVISION™ line of cameras. Standard Stainless Steel cameras come in both color and black & white; they are extremely rugged and are designed for use in two-inch (5 cm) and larger diameter bores, up to 2,000 feet (600 meters) deep. These cameras can be used alone or mounted on a Pan-Tilt Control for easy joystick manipulation.

The Standard Stainless Steel cameras are standard NTSC resolution with an aspect ratio of 4:3. Illumination is provided by eight high intensity white LEDs. The LEDs can be turned on or off unless the camera is used with a Light-Duty winch, in which case the LEDs are always on. Standard Stainless Steel cameras are rated to 1,000 psi and can be used with Light-Duty, Heavy-Duty and Deluxe systems.

Standard Stainless Steel cameras have a mounting screw near the front of the camera for attaching accessories such as a side-looking mirror or a ball compass. In shallow wells, these cameras can be connected to a pipe-string providing an economical way to pan and tilt the camera from the surface.

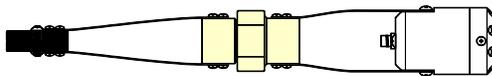
When using a Standard Stainless Steel Camera on a Deluxe winch **without** a Pan-Tilt Control, be sure to set the Camera Select switch to the “**Standard SS, Nano or CPVC Camera Alone**” position as shown below.



Configuring the camera for use

There are four primary ways to configure a Standard Stainless Steel camera for use in a bore hole. Each is listed below. A detailed description of how to build each of these configurations is given in the following pages unless otherwise noted.

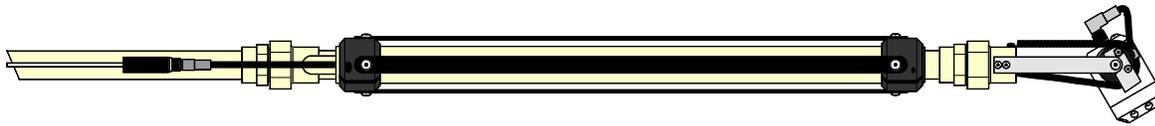
1. The camera and Camera Mount are screwed to the Cable Support Clamp. This configuration can be used in bores as small as two-inches (5 cm) and does not use the Centralizer. The benefit of not using the centralizer is that the camera can pass through tighter bends than it could if the centralizer was added.



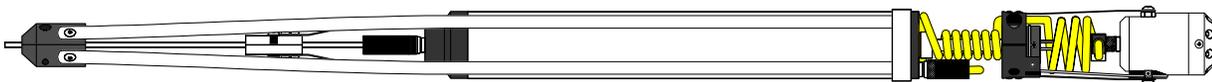
2. The camera and Camera Mount are screwed to the Centralizer. This configuration allows you to keep the camera from hugging the wall of the bore so closely that the image of the close wall is out of focus. It can be used in two-inch (5 cm) and larger bores, but in small diameter bores, if the bore is not relatively straight, this long configuration can wedge in the bore.



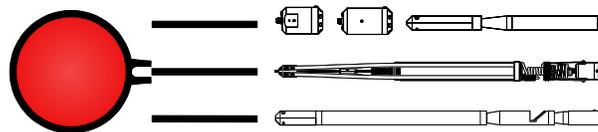
- The camera is connected to the Tilting Camera Mount which is then screwed to a Pipe-String Centralizer which is then screwed to a pipe-string. Here a pipe-string refers to multiple 10-foot lengths of 1/2-inch or 3/4-inch pipe, fitted with a 3/4-inch female pipe thread adapter on one end and a 3/4-inch male pipe thread adapter on the other. The pipe string now supports the camera allowing the winch cable to remain slack. Pulling on and releasing the winch cable tilts the camera up and down and the camera can be rotated by rotating the pipe-string. This configuration requires two people and has been used in bores to depths exceeding 300-feet (100 meters). Due to the increasing weight of the pipe-string, care must be taken when a pipe-string is used in bores over 200-feet (60 meters) deep. It is also important to note that it is not possible to use the On-Screen Depth Display (OSD) with a pipe-string; you must rely on the depth markings printed on the cable for keeping track of depth.



- The camera is mounted on a Pan-Tilt Control. This configuration is only possible with a Deluxe winch, but it allows the camera to pass through two-inch (5 cm) or larger bores and pan and tilt the camera in six-inch (15 cm) and larger voids. The Pan-Tilt Control is operated using the joystick on the Deluxe winch and can be easily operated by one person. Detailed instructions on the setup and use of the Pan-Tilt Control can be found in Appendix E of the Deluxe User's Manual.

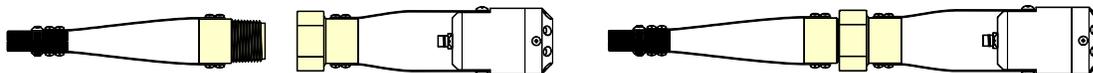


When using a Standard Stainless Steel Camera on a Deluxe winch **with** a Pan-Tilt Control, be sure to set the Camera Select switch to the **“Pan-Tilt With Camera”** position as shown below.

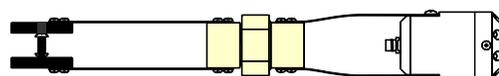


Configuration 1

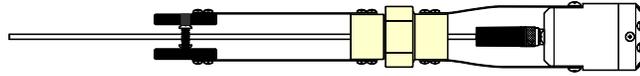
Mount the camera to the Camera Support as described in Appendix E. Screw the camera and Camera Mount to the Cable Support Clamp.



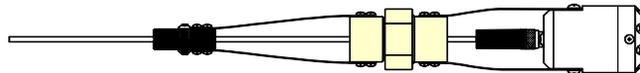
Loosen the two screws that hold the cable clamp together and slide the two halves sideways to open the clamp.



Lightly coat the pins in the connector on the rear of the camera with silicone grease. Pass the winch cable between the open halves of the clamp, through the Cable Support Clamp body and up to the camera. Align the holes in the connector on the end of the winch cable with the pins in the camera and connect the two by rotating the knurled metal nut on the cable connector. Tighten the nut finger tight only; do not use any tools to tighten the nut.



Slide the two halves of the clamp together over the cable and tighten the two clamping screws to complete the connection.

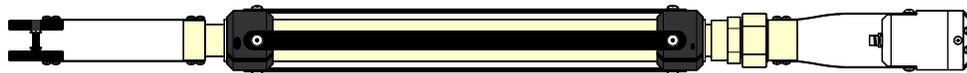


Configuration 2

Mount the camera to the Camera Support as described in Appendix E. Screw the camera and Camera Mount to the Centralizer and the Cable Support Clamp.



Loosen the two screws that hold the cable clamp together and slide the two halves sideways to open the clamp.



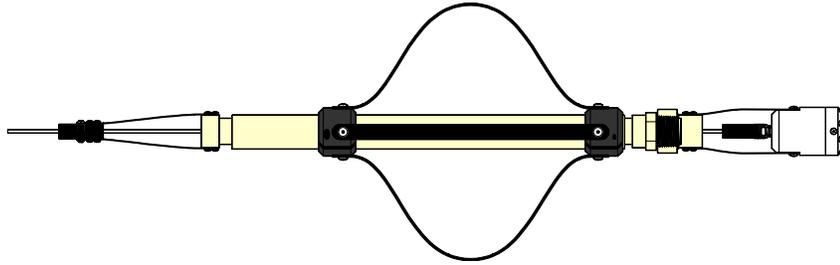
Lightly coat the pins in the connector on the rear of the camera with silicone grease. Pass the winch cable between the open halves of the clamp, through the Cable Support Clamp body, Centralizer and up to the camera. Align the holes in the connector on the end of the winch cable with the pins in the camera and connect the two by rotating the knurled metal nut on the cable connector. Tighten the nut finger tight only; do not use any tools to tighten the nut.



Slide the two halves of the clamp together over the cable and tighten the two clamping screws to complete the connection.



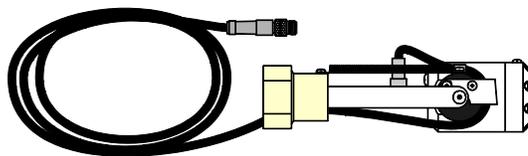
Slide the Centralizer Strap Clamp nearest the Cable Support Clamp towards the camera until the Centralizer Straps expand enough to easily pass through the smallest section of the bore.



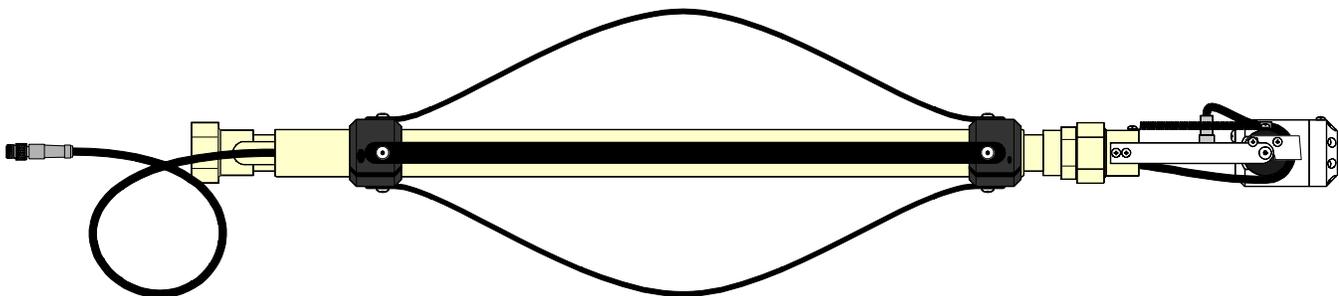
Configuration 3

Build as many sections of pipe-string as are needed to reach the part of the bore you wish to video but do not connect the sections together at this point. The pipe-string can be constructed of 10-foot lengths of either 1/2-inch or 3/4-inch PVC or CPVC pipe. Glue a 3/4-inch female pipe thread adapter to one end of each piece of pipe and a 3/4-inch male pipe thread adapter to the other end.

Mount the camera on the Manual Tilt Head as described in Appendix F



Pass the flexible 1-meter cable through the Pipe-String Centralizer center pipe and out through the hole in the side of the centralizer. Screw the Pipe-String Centralizer onto the Manual Tilt Head. Slide the back most Centralizer Strap Clamp towards the camera until the straps expand enough to easily pass through the smallest section of the bore.



The first section of the pipe string can now be screwed to the centralizer. Note that the winch cable runs outside the pipe-string, not inside it. Connect the Flexible cable shown above to the winch cable, using a light coating of silicone grease and lower the camera into the bore.

To pan the camera, rotate the pipe. To tilt the camera, gently pull on the winch cable. Add additional sections of pipe string as needed.

Standard Stainless Steel Color Camera Specifications

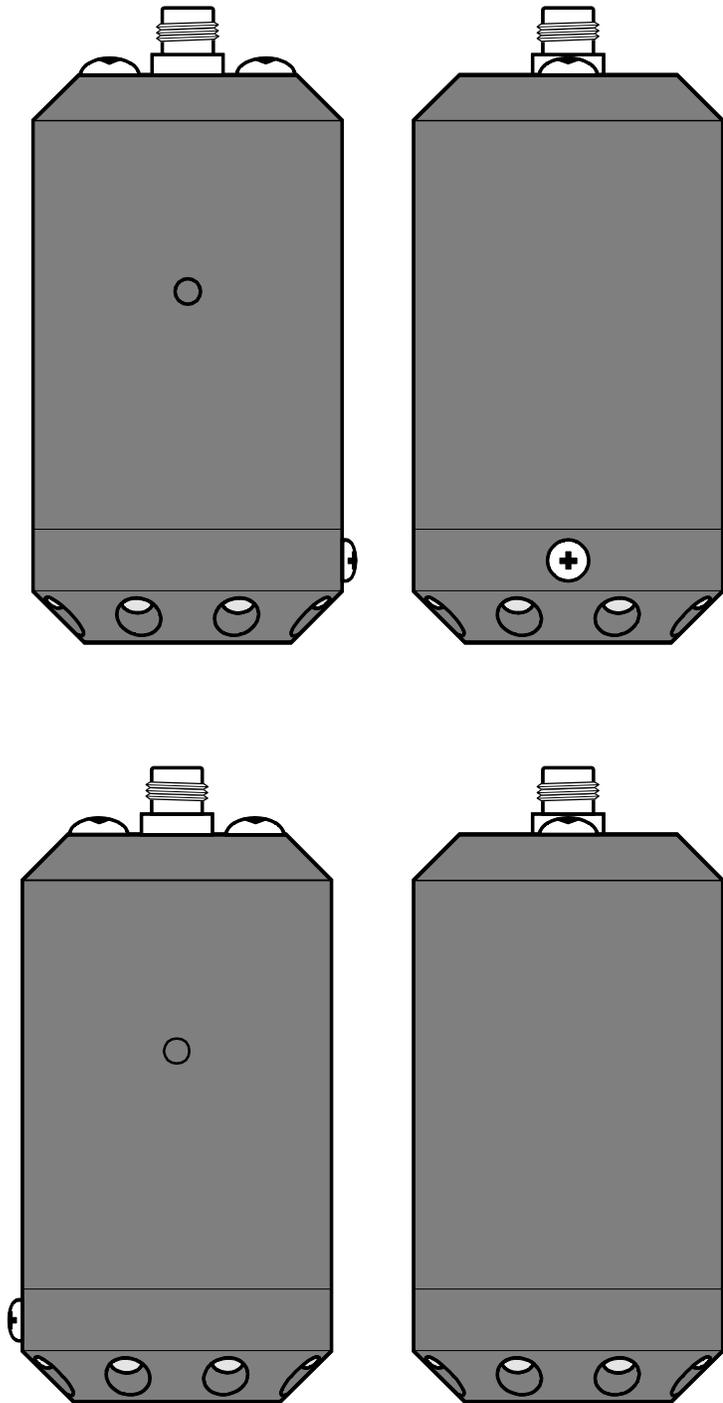
Weight	12 Ounces (340 g)
Dimensions	2-7/8" long x 1-5/8" diameter (7.3 cm x 4.1 cm)
Standard Lens	2.45 mm
Angle of View (in air)	~150°
Aperture	F2.0
CCD	1/3" Sony Super HAD CCD II
Video Format	NTSC
Horizontal Resolution	550 Lines
Effective Pixels	768 Horizontal x 494 Vertical
Minimum Illumination	0.05 Lux.
Operating Temperature	-40° F ~ 122° F (-40° C ~ 50° C)
Light Source	8 High Intensity White LEDs
Maximum Depth	2000 Feet Underwater (600 meters)
Maximum Pressure	1000 psi
Current Draw	120 mA
Window Material	Sapphire

Standard Stainless Steel Black and White Camera Specifications

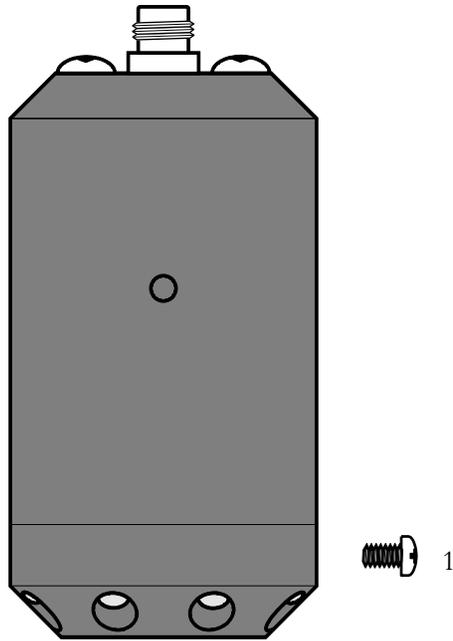
Weight	12 Ounces (340 g)
Dimensions	2-7/8" long x 1-5/8" diameter (7.3 cm x 4.1 cm)
Standard Lens	3.6 mm
Angle of View (in air)	~92°
Aperture	F2.0
CCD	1/3" Sony ExView B/W CCD II
Video Format	NTSC
Horizontal Resolution	420 Lines
Effective Pixels	510 Horizontal x 492 Vertical
Minimum Illumination	0.0003 Lux.
Operating Temperature	-40° F ~ 122° F (-40° C ~ 50° C)
Light Source	8 High Intensity White LEDs
Maximum Depth	2000 Feet Underwater (300 meters)
Maximum Pressure	1000 psi
Current Draw	160 mA
Window Material	Sapphire

Appendix C

Standard Plastic Cameras



Plastic Camera Exploded View



1) MP-0145 #4-40 x 3/16 Stainless Steel Screw

NOTE: The two stainless steel #8 screws in the rear of the camera must never be removed. They are used during assembly and then the holes in the screw heads are filled with epoxy. If these screws are removed or loosened, the camera will leak.

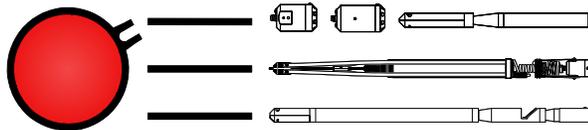
Overview

The Standard Plastic camera is durable and yet affordable video camera. Standard Plastic cameras come in both color and black & white; they are rugged and are designed for use in two-inch (5 cm) and larger diameter bores, up to 1,000 feet (300 meters) deep. These cameras can be used alone or mounted on a Pan-Tilt Control for easy joystick manipulation when connected to a Deluxe winch.

The Standard Plastic cameras are standard NTSC resolution with an aspect ratio of 4:3. Illumination is provided by eight high intensity white LEDs. Standard Plastic cameras are rated to 500 psi and can be used with Light-Duty, Heavy-Duty and Deluxe systems.

Standard Plastic cameras have a mounting screw near the front of the camera for attaching accessories such as a side-looking mirror or a ball compass. In shallow wells, these cameras can be connected to a pipe-string providing an economical way to pan and tilt the camera from the surface.

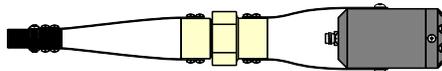
When using a Standard Plastic Camera on a Deluxe winch **without** a Pan-Tilt Control, be sure to set the Camera Select switch to the “**Standard SS, Nano or CPVC Camera Alone**” position as shown below.



Configuring the camera for use

There are four primary ways to configure a Standard Plastic camera for use in a bore hole. Each is listed below. A detailed description of how to build each of these configurations is given in the following pages unless otherwise noted.

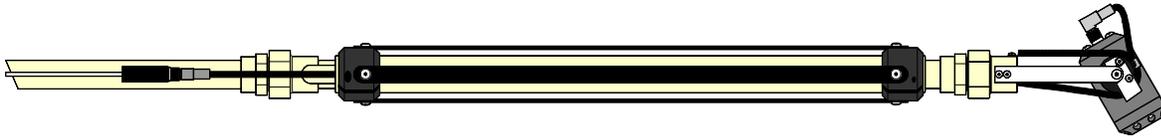
1. The camera and Camera Mount are screwed to the Cable Support. This configuration can be used in bores as small as two-inches (5 cm) and does not use the Centralizer. The benefit of not using the centralizer is that the camera can pass through tighter bends than it could if the centralizer was added.



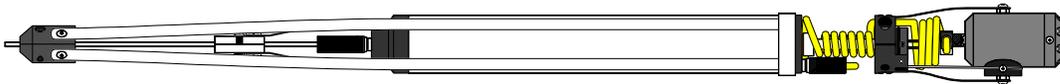
2. The camera and Camera Mount are screwed to the Centralizer. This configuration allows you to keep the camera from hugging the wall of the bore so closely that the image of the close wall is out of focus. It can be used in two-inch (5 cm) and larger bores, but in small diameter bores, if the bore is not relatively straight, this long configuration can wedge in the bore.



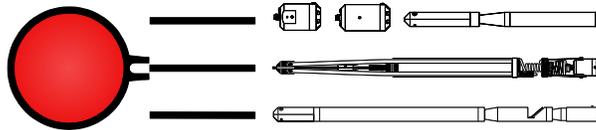
- 3. The camera is connected to the Tilting Camera Mount which is then screwed to a Pipe-String Centralizer which is then screwed to a pipe-string. Here a pipe-string refers to multiple 10-foot lengths of 1/2-inch or 3/4-inch pipe, fitted with a 3/4-inch female pipe thread adapter on one end and a 3/4-inch male pipe thread adapter on the other. The pipe string now supports the camera allowing the winch cable to remain slack. Pulling on and releasing the winch cable tilts the camera up and down and the camera can be rotated by rotating the pipe-string. This configuration requires two people and has been used in bores to depths exceeding 300-feet (100 meters). Due to the increasing weight of the pipe-string, care must be taken when a pipe-string is used in bores over 200-feet (60 meters) deep. It is also important to note that it is not possible to use the On-Screen Depth Display (OSD) with a pipe-string; you must rely on the depth markings printed on the cable for keeping track of depth.



- 4. The camera is mounted on a Pan-Tilt Control. This configuration is only possible with a Deluxe winch, but it allows the camera to pass through two-inch (5 cm) or larger bores and pan and tilt the camera in six-inch (15 cm) and larger voids. The Pan-Tilt Control is operated using the joystick on the Deluxe winch and can be easily operated by one person. Detailed instructions on the setup and use of the Pan-Tilt Control can be found in Appendix E of the Deluxe User's Manual.

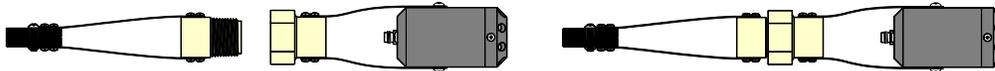


When using a Standard Plastic Camera on a Deluxe winch **with** a Pan-Tilt Control, be sure to set the Camera Select switch to the **“Pan-Tilt With Camera”** position as shown below.

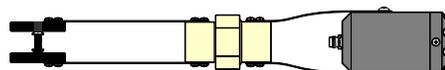


Configuration 1

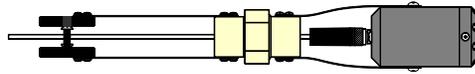
Mount the camera to the Camera Support as described in Appendix E. Screw the camera and Camera Mount to the Cable Support Clamp.



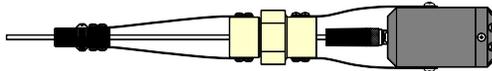
Loosen the two screws that hold the cable clamp together and slide the two halves sideways to open the clamp.



Lightly coat the pins in the connector on the rear of the camera with silicone grease. Pass the winch cable between the open halves of the clamp, through the Cable Support Clamp body and up to the camera. Align the holes in the connector on the end of the winch cable with the pins in the camera and connect the two by rotating the knurled metal nut on the cable connector. Tighten the nut finger tight only; do not use any tools to tighten the nut.



Slide the two halves of the clamp together over the cable and tighten the two clamping screws to complete the connection.



Configuration 2

Mount the camera on the Camera Support as described in Appendix E. Screw the camera and Camera Mount to the Centralizer.



Loosen the two screws that hold the cable clamp together and slide the two halves sideways to open the clamp.



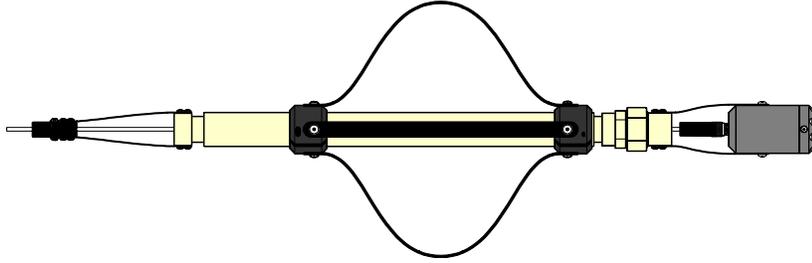
Lightly coat the pins in the connector on the rear of the camera with silicone grease. Pass the winch cable between the open halves of the clamp, through the Cable Support Clamp body, Centralizer and up to the camera. Align the holes in the connector on the end of the winch cable with the pins in the camera and connect the two by rotating the knurled metal nut on the cable connector. Tighten the nut finger tight only; do not use any tools to tighten the nut.



Slide the two halves of the clamp together over the cable and tighten the two clamping screws to complete the connection.



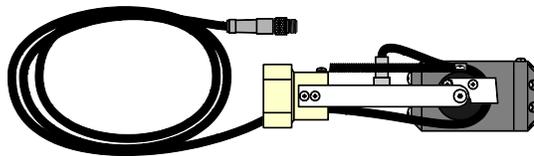
Slide the Centralizer Strap Clamp nearest the Cable Support Clamp towards the camera until the Centralizer Straps expand enough to easily pass through the smallest section of the bore.



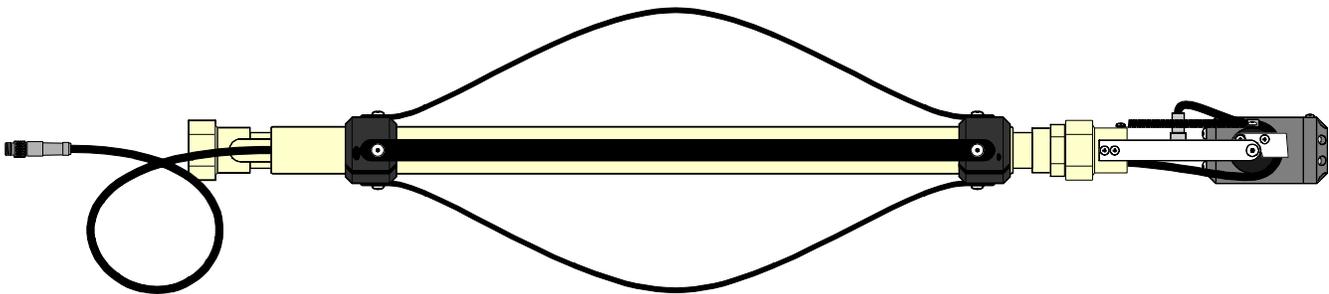
Configuration 3

Build as many sections of pipe-string as are needed to reach the part of the bore you wish to video but do not connect the sections together at this point. The pipe-string can be constructed of 10-foot lengths of either 1/2-inch or 3/4-inch PVC or CPVC pipe. Glue a 3/4-inch female pipe thread adapter to one end of each piece of pipe and a 3/4-inch male pipe thread adapter to the other end.

Mount the camera on the Manual Tilt Head as described in Appendix G



Pass the flexible 1-meter cable through the Pipe-String Centralizer center pipe and out through the hole in the side of the centralizer. Screw the Pipe-String Centralizer onto the Manual Tilt Head. Slide the back most Centralizer Strap Clamp towards the camera until the straps expand enough to easily pass through the smallest section of the bore.



The first section of the pipe string can now be screwed to the centralizer. Note that the winch cable runs outside the pipe-string, not inside it. Connect the Flexible cable shown above to the winch cable, using a light coating of silicone grease and lower the camera into the bore. To pan the camera, rotate the pipe.

To tilt the camera, gently pull on the winch cable. Add additional sections of pipe string as needed.

Plastic Color Camera Specifications

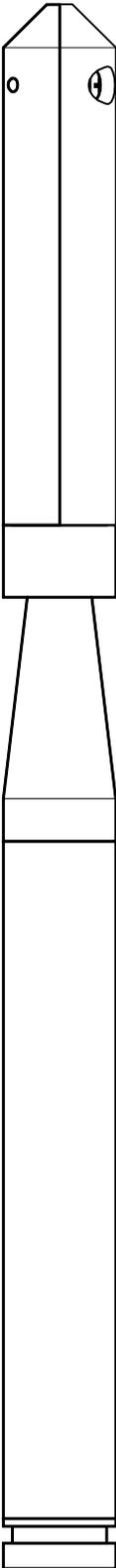
Weight	4.5 Ounces
Dimensions	3-3/8" long x 1-5/8" diameter (8.6 cm x 4.1 cm)
Standard Lens	2.97 mm
Angle of View (in air)	~130°
Aperture	F2.0
CCD	1/3" Sony Super HAD CCD II
Video Format	NTSC
Horizontal Resolution	550 Lines
Effective Pixels	768 Horizontal x 494 Vertical
Minimum Illumination	0.05 Lux.
Operating Temperature	-40° F ~ 110° F (-40° C ~ 43° C)
Light Source	8 High Intensity White LEDs
Maximum Depth	1000 Feet Underwater (300 meters)
Maximum Pressure	500 psi
Current Draw	120 mA
Window Material	Glass
Exposure Control	No

Plastic Black and White Camera Specifications

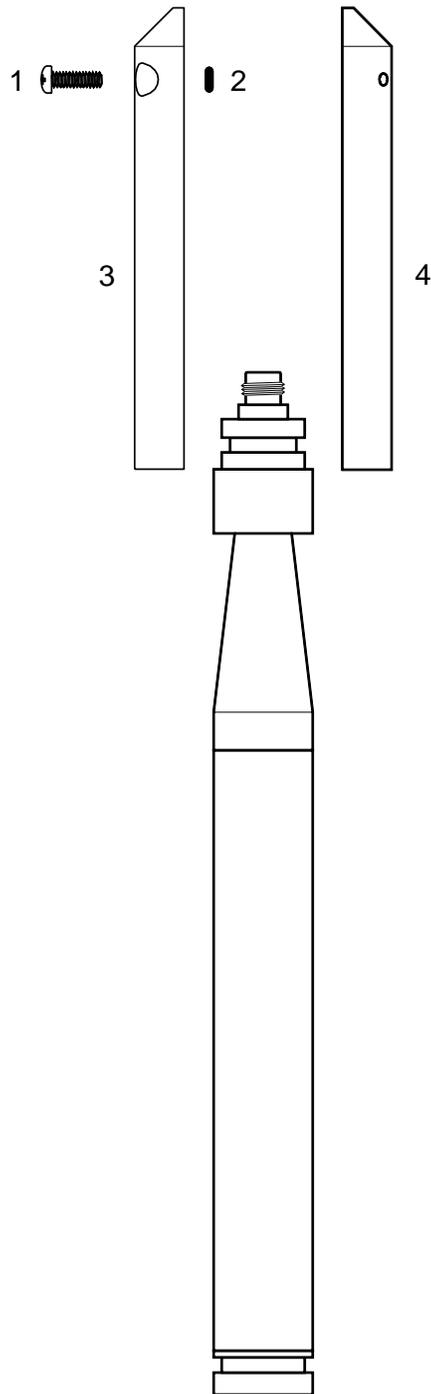
Weight	4.5 Ounces
Dimensions	3-3/8" long x 1-5/8" diameter (8.6 cm x 4.1 cm)
Standard Lens	3.6 mm
Angle of View (in air)	~92°
Aperture	F2.0
CCD	1/3" Sony ExView B/W CCD II
Video Format	NTSC
Horizontal Resolution	420 Lines
Effective Pixels	510 Horizontal x 492 Vertical
Minimum Illumination	0.0003 Lux.
Operating Temperature	-40° F ~ 110° F (-40° C ~ 43° C)
Light Source	8 High Intensity White LEDs
Maximum Depth	1000 Feet Underwater (300 meters)
Maximum Pressure	500 psi
Current Draw	160 mA
Window Material	Glass
Exposure Control	No

Appendix D

Nano Camera



Nano Camera Exploded View

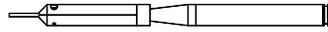


- 1) MP-0502 #4-40 x 3/8 Stainless Steel Screw
- 2) MP-1633 Buna-N #003 O-Ring
- 3) GVJR-1035 Nano Clamp Unthreaded Half
- 4) GVJR-1034 Nano Clamp Threaded Half

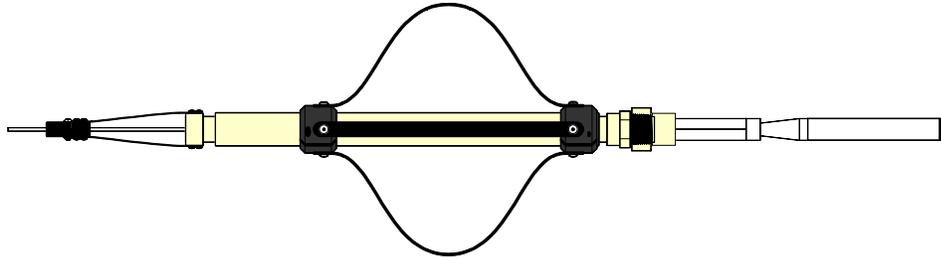
Configuring the camera for use

There are two primary ways to configure a Nano camera for use in a bore hole, each is listed below. A detailed description of how to assemble each of these configurations is given in the following pages unless otherwise noted.

1. The Nano camera is attached to the winch cable and no centralizer is used.

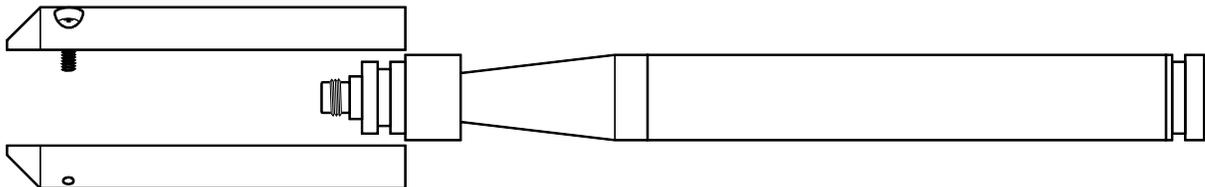


2. The camera is connected to the centralizer using the Nano Camera Adapter.

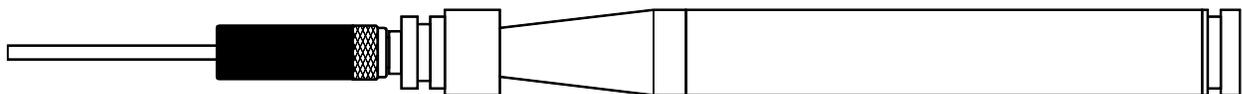


Configuration 1

Loosen the two screws that hold the halves of the Nano Cable Clamp together and remove the clamp. The screws are fitted with small o-rings to prevent the screws from falling out when loose, so be careful not to remove the screw from the o-ring.



Lightly coat the pins in the connector on the rear of the camera with silicone grease, align the holes in the connector on the end of the winch cable with the pins and connect the camera to the winch cable by rotating the knurled metal nut on the cable connector. Tighten the nut finger tight only; do not use any tools to tighten the nut.

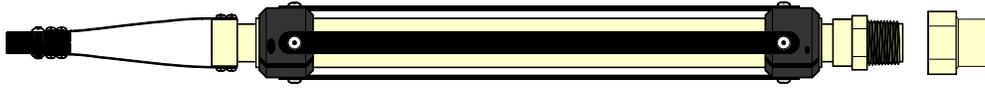


Reassemble the clamp around the cable and the camera and tighten the screws to clamp the camera onto the cable.

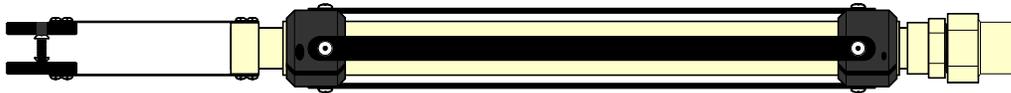


Configuration 2

Screw the Nano Camera Adapter to the end of the centralizer.



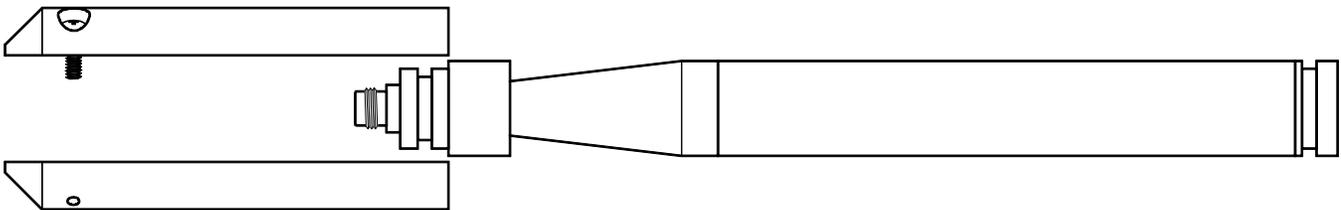
Loosen the two screws that hold the clamp together and slide the two halves apart.



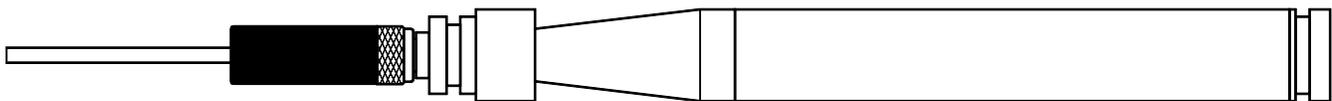
Pass the winch cable through the clamp and the centralizer and out through the adapter.



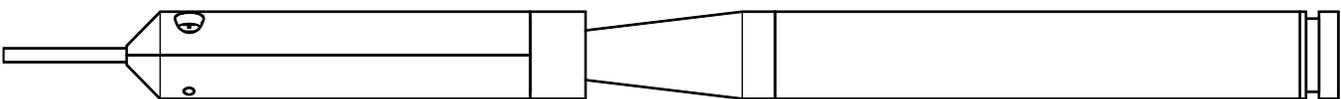
Loosen the two screws that hold the halves of the Nano Cable Clamp together and remove the clamp. The screws are fitted with small o-rings to prevent the screws from falling out when loose, so be careful not to remove the o-rings from the screws.



Lightly coat the pins in the camera's connector with silicone grease, align the holes in the connector on the end of the winch cable with the pins and connect the camera to the winch cable by rotating the knurled metal nut on the connector. Tighten the nut finger tight only, do not use any tools to tighten the nut.



Reassemble the clamp around the cable and the camera and tighten the screws to clamp the camera onto the cable.



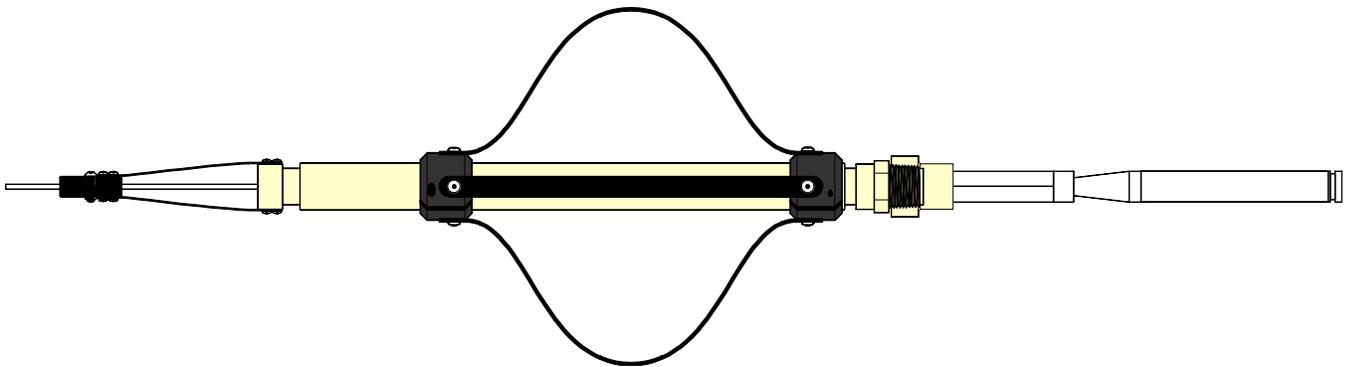
Slide the centralizer down to the Nano camera so that the Nano Camera Adapter slides over the end of the camera.



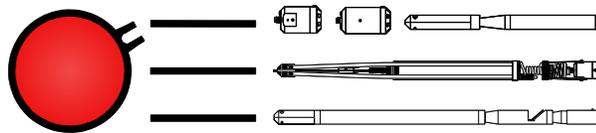
Tighten the Cable Support clamp so that the Nano Camera is now firmly connected to the centralizer assembly.



Adjust the centralizer straps for the bore diameter



When using a Nano Camera on a Deluxe Winch, be sure to set the Camera Select switch for the Nano camera as shown below.



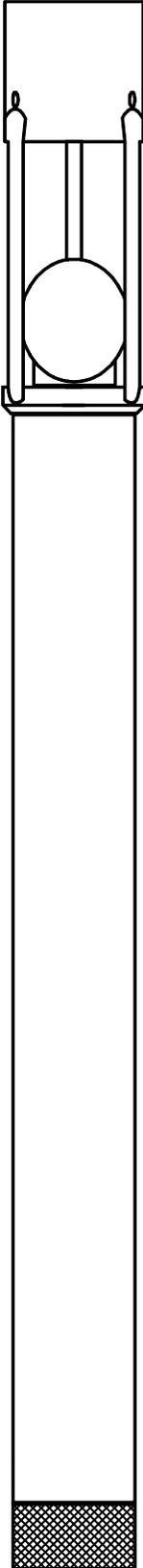
If you intend to use the Nano Camera with a Nano Rotating Mirror, please see Appendix O now.

Nano Camera Specifications

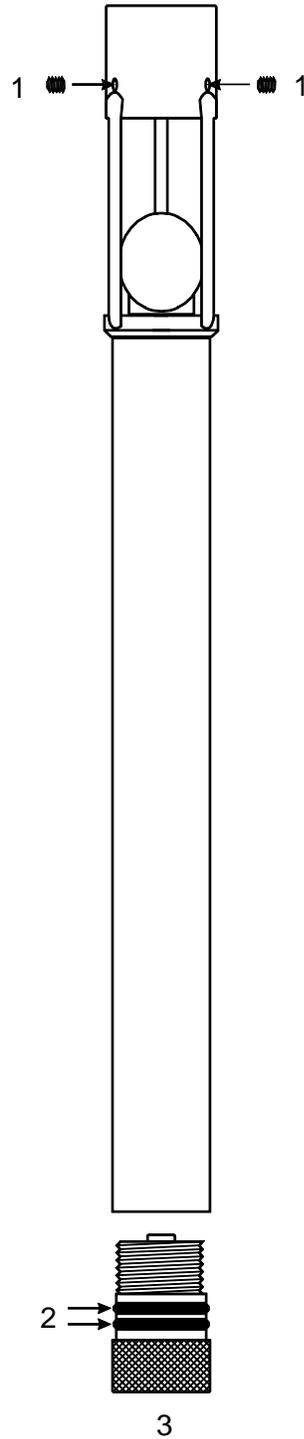
Weight	10.1 Ounces (286 g)
Dimensions	10-1/4" long x 3/4" diameter (26 cm x 2 cm)
Standard Lens	2.97 mm
Angle of View (in air)	~130°
Aperture	F2.0
CCD	1/3" Sony Super HAD CCD II
Video Format	NTSC
Horizontal Resolution	550 Lines
Effective Pixels	768 Horizontal x 494 Vertical
Minimum Illumination	0.05 Lux.
Operating Temperature	-40° F ~ 122° F (-40° C ~ 50° C)
Light Source	6 High Intensity White LEDs
Maximum Depth	2000 Feet Underwater (600 meters)
Maximum Pressure	1000 psi
Current Draw	190 mA

Appendix E

Nano Rotating Mirror



Nano Rotating Mirror Exploded View

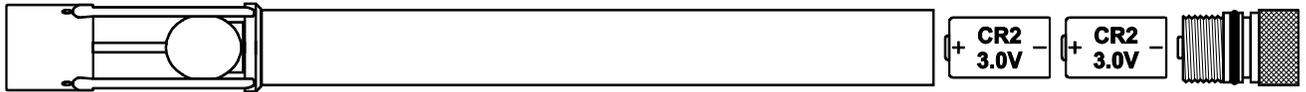


- 1) MP-1480 #4-40 x 1/8 Stainless Steel Set Screws
- 2) MP-1589 Buna-N #014 O-Rings
- 3) GVJR-1097 Nano Rotating Mirror Rear End Cap

Battery Installation

Install the batteries in the mirror in one of two ways depending on the desired results. Once the batteries are installed, tighten the knurled rear end cap to turn on the motor and loosen it to turn the motor off.

1. The preferred method of installation is shown below. With the batteries are installed this way, the mirror will rotate approximately 30°, pause for a few seconds and then continue. The pause in rotation gives you a clear image for generating a photo and aids in interpreting what you see.

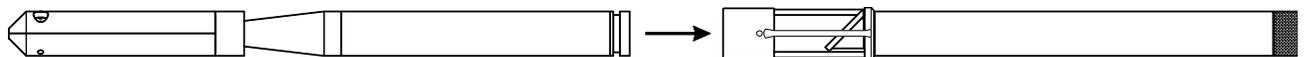


2. The alternate method is shown below and results in a constantly rotating mirror with no pauses.



The Nano Rotating Mirror is attached to the Nano camera using three #4-40 x 1/8" set screws as follows. It is easiest to attach the mirror to the camera before the camera is attached to the winch/reel cable, however it is not necessary.

3. With the set screws removed from the front of the mirror, slide the front of the Nano camera into the front of the Nano Rotating Mirror.



4. Install the three #4-40 x 1/8" set screws into and through the front of the mirror housing so that they go all the way into the groove in the front end cap of the Nano camera.



The camera and mirror can now be attached to the winch/reel cable. To turn the mirror on, tighten the mirror's knurled endcap, to turn the mirror off, loosen the knurled endcap until the rotation stops.

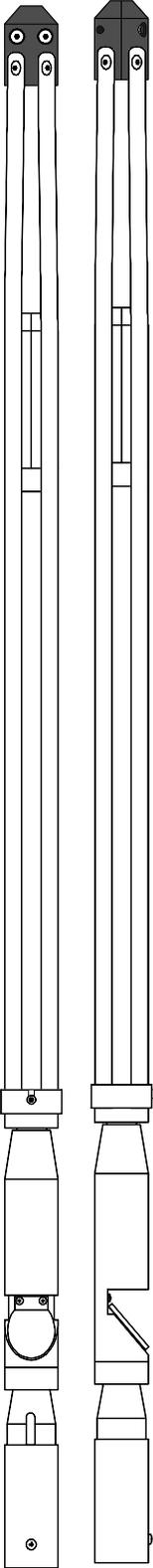
Note: the batteries should always be removed from the Nano Rotating Mirror when it is not on use.

Nano Rotating Mirror Specifications

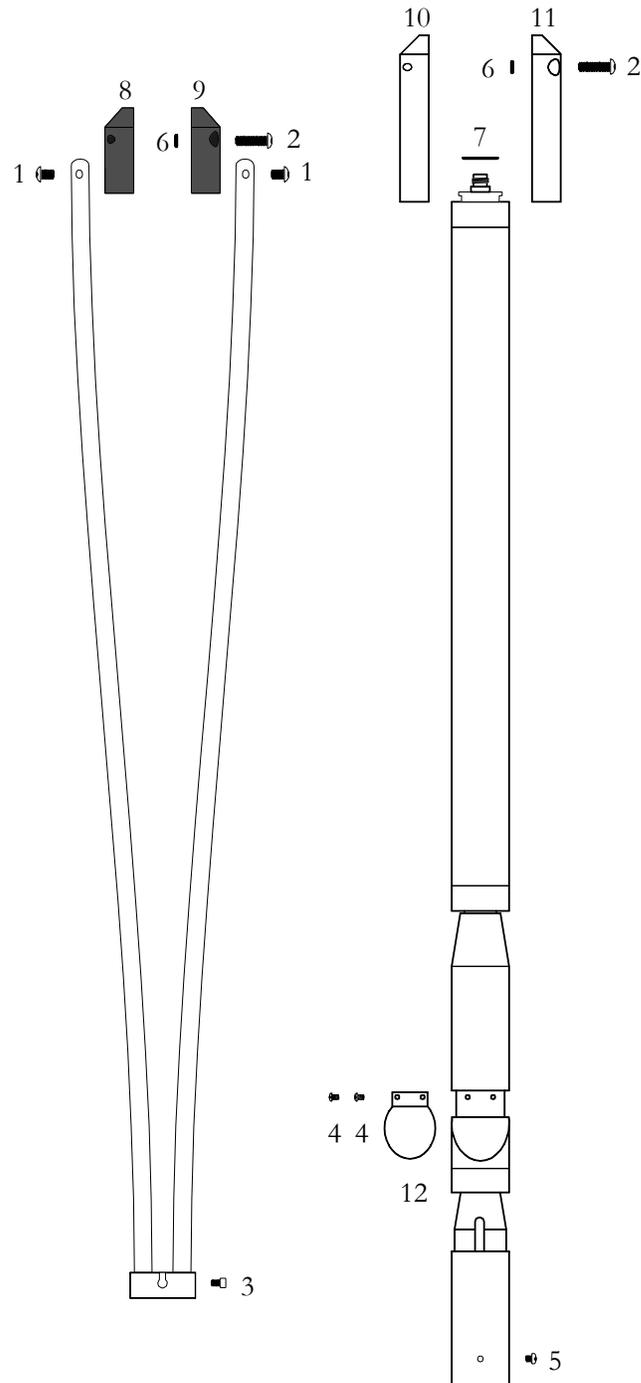
Weight	9.5 Ounces (270 g)
Dimensions	9-3/4" long x 15/16" diameter (22 cm x 2.3 cm)
Batteries	2 CR2 Lithium 3Volt
Operating Temperature	-4° F ~ 167° F (-20° C~75° C)
Maximum Depth	2000 Feet Underwater (600 meters)
Maximum Pressure	1000 psi

Appendix F

Dual-Scan Camera



Dual-Scan Camera Exploded View



- | | |
|--|---|
| 1) MP-0135 #8-32 x 1/4" Stainless Steel Screw | 7) MP-1670 18 mm x 1 mm Buna-N O-Ring |
| 2) MP-0152 #8-32 x 5/8" Stainless Steel Screw | 8) GVJR-0821 Centralizer Clamp Half #2 |
| 3) MP-1714 #4-40 x 3/16" Stainless Steel Screw | 9) GVJR-0822 Centralizer Clamp Half #1 |
| 4) MP-0700 #2-56 x 3/16" Stainless Steel Screw | 10) GV-0941 Dual-Scan Clamp Threaded Half |
| 5) MP-0541 #4-40 x 1/8" Stainless Steel Screw | 11) GV-0940 Dual-Scan Clamp Unthreaded Half |
| 6) MP-0507 #005 Buna-N O-Ring | 12) GVJR-1319 Dual-Scan Mirror & Bracket |

Introduction

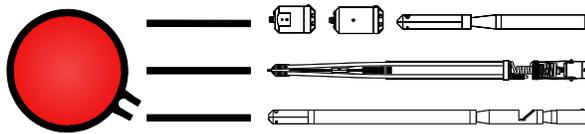
The GeoVISION™ Dual-Scan camera is Allegheny Instruments most advanced camera ever. It has three independently controlled banks of high intensity LED lights and the ability to rotate more than 360°. The Dual-Scan's state of the art video modules provide unparalleled video images in bores as small as 1-1/2" (4 cm) in diameter and up to 2,000 feet (600 meters) deep.

The Dual-Scan camera is actually two cameras in one. One camera continually looks down while the second camera scans the bore wall. The two cameras can be rotated from the surface using a joystick; this feature provides an uninterrupted 360° pan of both cameras simultaneously.

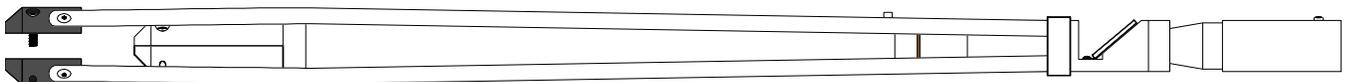
The Dual-Scan camera has standard NTSC resolution with an aspect ratio of 4:3. Illumination is provided by three banks of high intensity white LEDs which can be turned on or off from the surface. The Dual-Scan camera is rated for use up to 1,000 psi and must be used with the Deluxe winch.

Operation

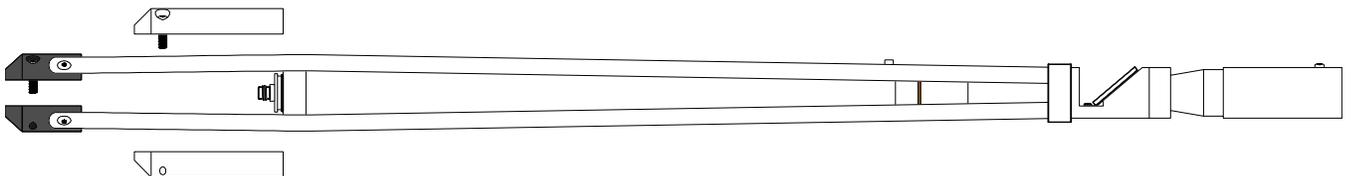
1. Set the Camera Select Switch on the Deluxe Winch Control Panel to the "Dual-Scan Camera" position as shown below.



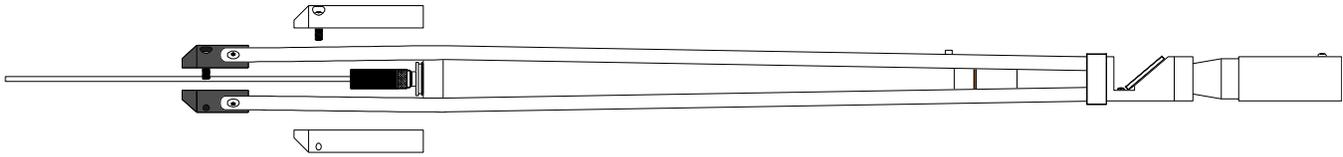
2. Loosen the two screws that hold the halves of the Centralizer Clamp together and open the clamp. Note that the screws are fitted with o-rings to prevent the screws from falling out of the clamp, do not remove the o-rings.



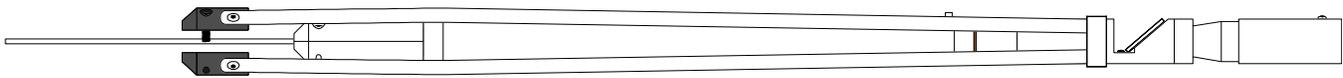
3. Loosen the two screws that hold the halves of the Dual-Scan Camera Clamp together and remove the clamp. Note that the screws are fitted with o-rings to prevent the screws from falling out of the clamp, do not remove the o-rings.



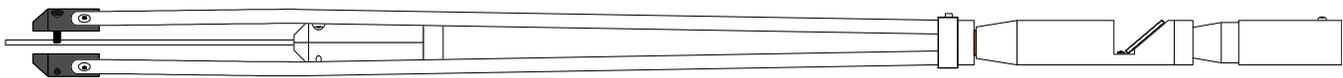
- If needed, lightly coat the pins in the connector on the rear of the camera with silicone grease, align the holes in the connector on the end of the winch cable with the pins and connect the camera to the winch cable by rotating the knurled metal nut on the cable connector. Tighten the nut finger tight only; do not use any tools to tighten the nut.



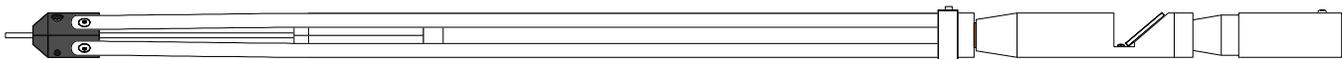
- Position the two halves of the Dual-Scan Camera Clamp around both the end of the camera and the winch cable and tighten the two screws that were loosened in step #3 to clamp the camera to the winch cable.



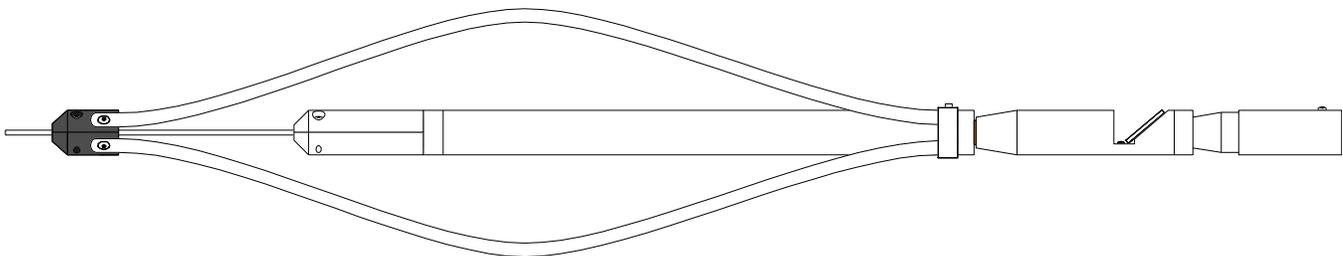
- Use a 3/32" hex driver to loosen the Centralizer retaining screw #3. Slide the Centralizer slot over the screw and then gently tighten the screw to lock the centralizer in place.



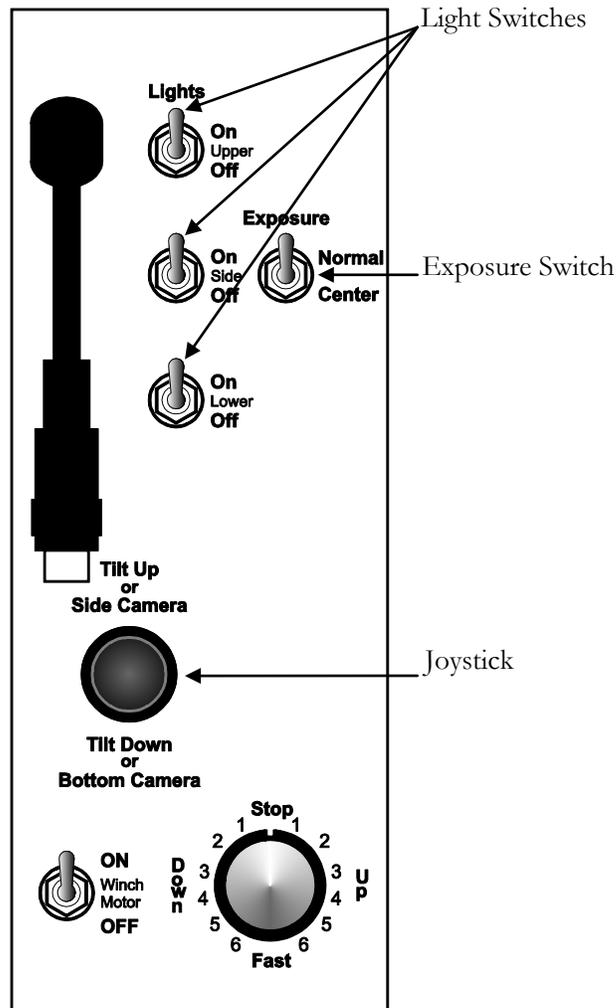
- Loosely tighten the Centralizer clamp around the winch cable so that the cable can slide through the clamp.



- Adjust the centralizer straps for the narrowest part of the bore by sliding the Centralizer Clamp down the cable toward the camera. Lock the Centralizer straps in place by tightening the clamp on the cable.

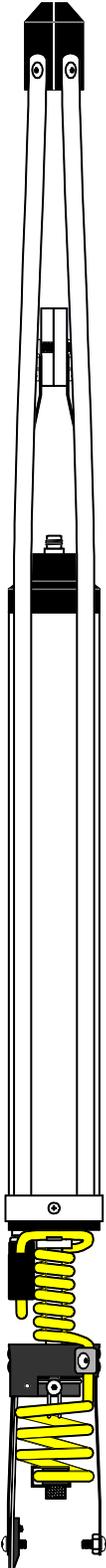


- Turn on the winch and check that all three banks of lights work correctly by using the three light switches. Move the Joystick up and then release it to switch to the side looking camera move the joystick down and then release it to switch to the down looking camera. Move the joystick to left to rotate the cameras left and to the right to rotate the cameras the right. Use the “**Exposure**” switch to change between “Normal” and “Center” exposure. Center exposure can be helpful if the center of the image appears dark. This can happen when the camera attempts to peer through a hole and into a void on the other side. Normal exposure is used in most other situations and will be the usual position for this switch.



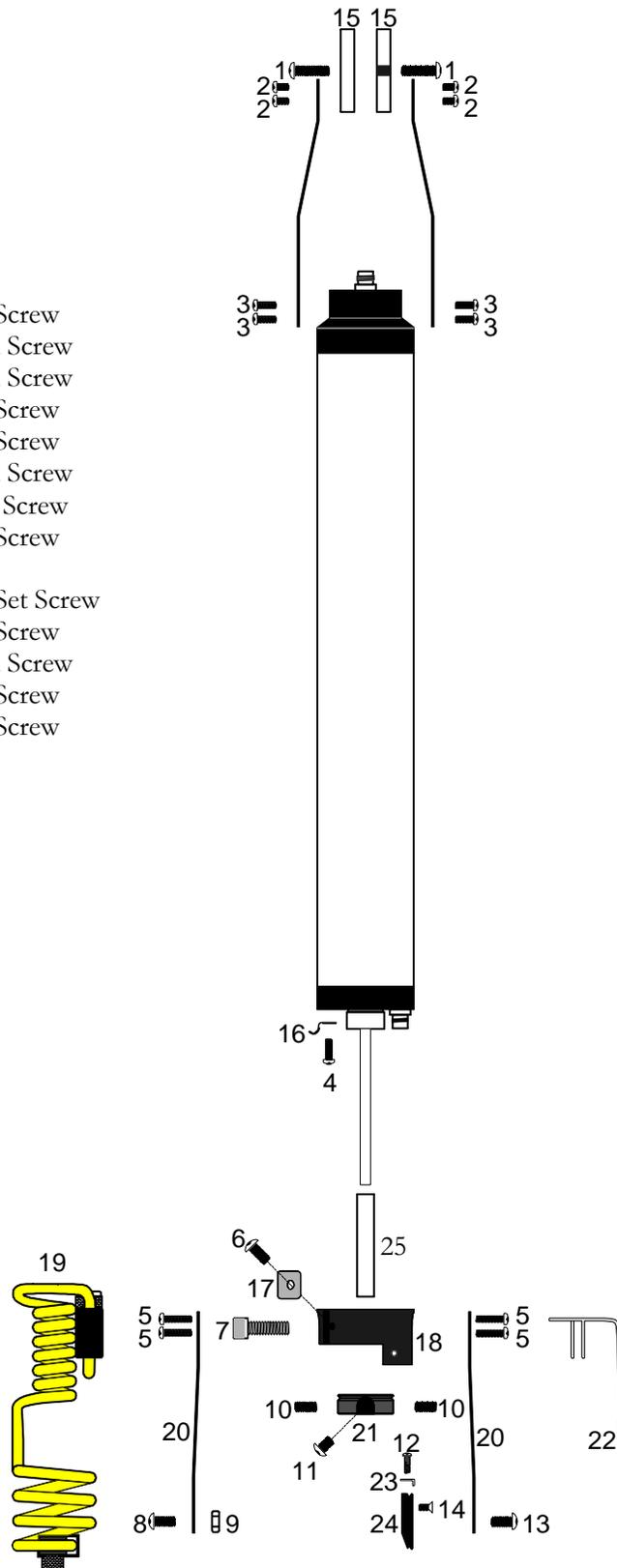
Appendix G

Pan-Tilt Control

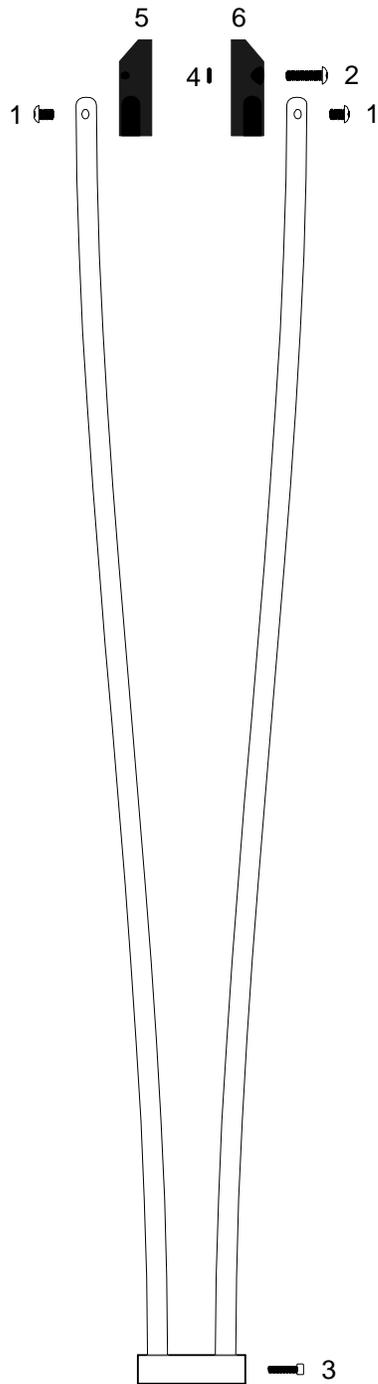


Pan-Tilt Control Explode View

- 1) MP-0152 #8-32 x 5/8" Stainless Steel Screw
- 2) MP-0145 #4-40 x 3/16" Stainless Steel Screw
- 3) MP-0110 #4-40 x 5/16" Stainless Steel Screw
- 4) MP-0502 #4-40 x 3/8" Stainless Steel Screw
- 5) MP-0502 #4-40 x 1/2" Stainless Steel Screw
- 6) MP-0026 #8-32 x 5/16" Stainless Steel Screw
- 7) MP-1097 1/4-20 x 3/4" Stainless Steel Screw
- 8) MP-0189 #8-32 x 3/8" Stainless Steel Screw
- 9) MP-0017 #8-32 Stainless Steel Nut
- 10) MP-1604 #8-32 x 3/8" Stainless Steel Set Screw
- 11) MP-0135 #8-32 x 1/4" Stainless Steel Screw
- 12) MP-0716 #2-56 x 5/16" Stainless Steel Screw
- 13) MP-0190 #8-32 x 1/2" Stainless Steel Screw
- 14) MP-1213 #4-40 x 1/4" Stainless Steel Screw
- 15) GVJR-0912 Stainless Steel Split Clamp
- 16) GVJR-1147 Curled Cord Clamp
- 17) GVJR-1145 Turntable Cord Clamp
- 18) GVJR-1114 Turntable
- 19) GVJR-1148 Curled Cord
- 20) GVJR-1110 Camera Mounting Strap
- 21) GVJR-1140 Tilt Shaft Pulley
- 22) GVJR-1320 Tilt Cord
- 23) GVJR-1146 Tilt Cord Clamp
- 24) GVJR-1142 Camera Tilt Pulley
- 25) GVJR-1139 Spacer Tube



Pan-Tilt Centralizer Exploded View



- 1) MP-0135 #8-32 x 1/4" Stainless Steel Screw
- 2) MP-0152 #8-32 x 5/8" Stainless Steel Screw
- 3) MP-0191 #4-32 x 1/2" Stainless Steel Screw
- 4) MP-0507 #005 Buna-N O-Ring
- 5) GVJR-0821 Centralizer Clamp Unthreaded Half
- 6) GVJR-0822 Centralizer Clamp Threaded Half

Introduction

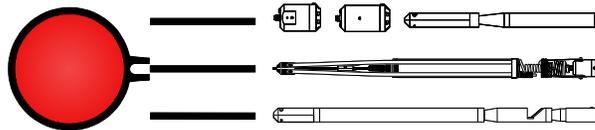
The GeoVISION™ Pan-Tilt Control is designed to rotate and tilt Standard Stainless Steel and Standard Plastic cameras inside a borehole. Using a Pan-Tilt Control, these cameras can be rotated 360-degrees and can tilt from looking straight down, to looking back up the bore. Camera manipulation is controlled using the joystick on a Deluxe Winch Control Panel.

The Pan-Tilt Control also allows the Standard Stainless Steel camera to be switched between Standard and Center Exposure modes. In Standard Exposure, the camera's exposure is set based on the light level across the entire image while in Center Exposure mode, the camera sets the exposure based only on the light level in the center of the image. This is useful when looking through small openings and into larger voids.

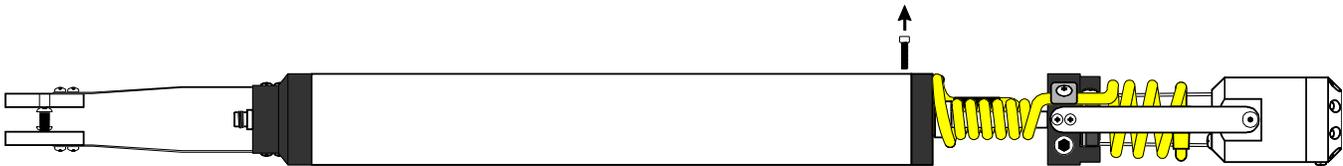
The Pan-Tilt Control can be operated to depths of 2,000 feet (600 meters) and must be used with a Deluxe Winch and either a Standard Stainless Steel or Standard Plastic camera.

Operation

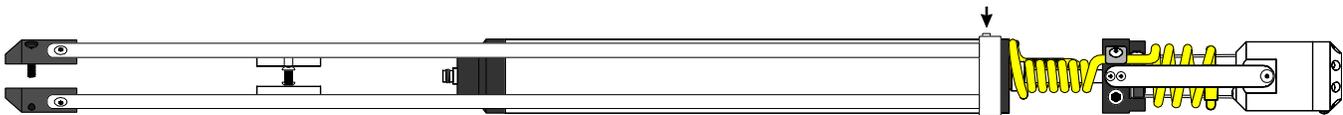
- Set the Camera Select Switch on the Deluxe Winch Control Panel to the "Pan-Tilt with Camera" position as shown.



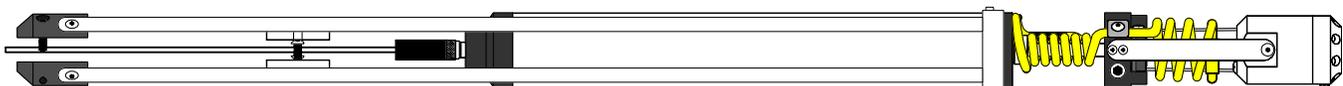
- If necessary, connect the centralizer to the Pan-Tilt Control. Remove the #4-40 x 1/2" screw that binds the Centralizer to the Pan-Tilt Control using a 3/32" hex driver.



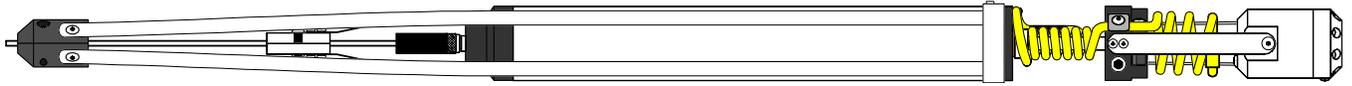
- Slide the Centralizer over the body of the Pan-Tilt Control and reinsert the screw through the slotted hole in the Centralizer and into the Pan-Tilt Control. In the future for storage, this screw can be loosened allowing the centralizer to slide up toward the camera. In this configuration, the Pan-Tilt Control and camera fit in the carrying case.



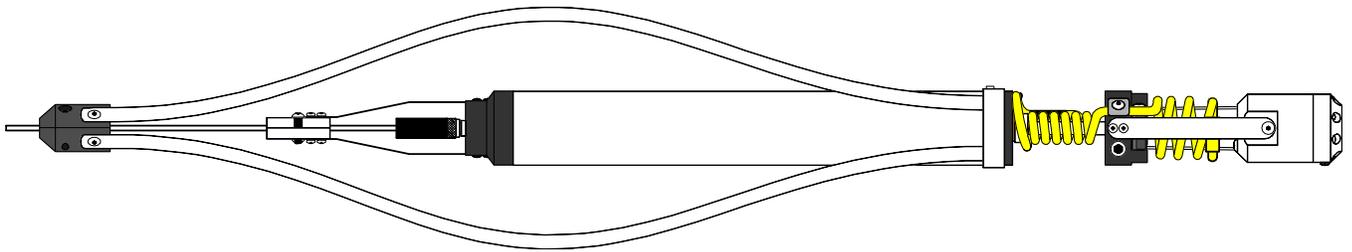
- Slide the winch cable between the halves of the clamps on the Centralizer and the Pan-Tilt Control and tighten the Cable End Connector to the connector in the Pan-Tilt Control. Finger tight only, no tools.



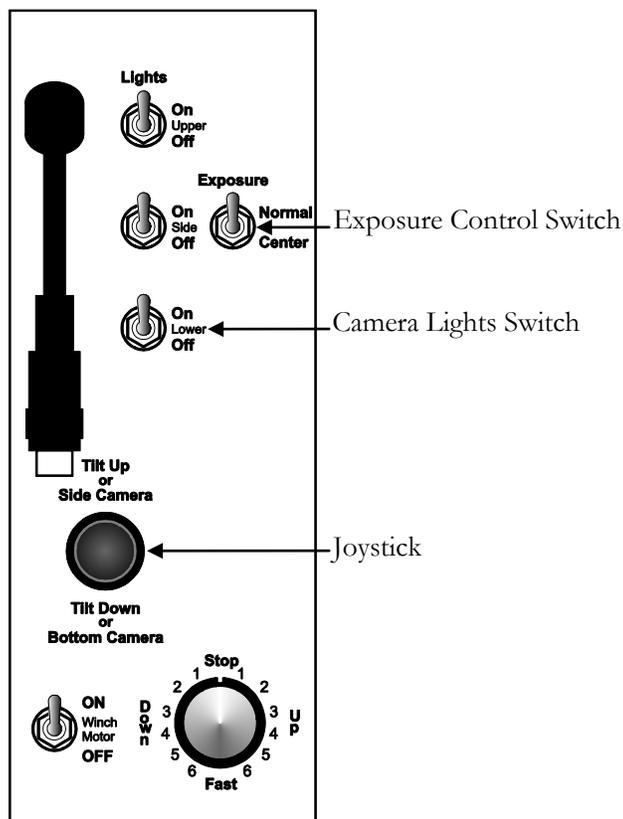
- Tighten the clamp on the Pan-Tilt Control firmly around the cable. Loosely tighten the halves of the Centralizer clamp around the cable. Be sure the winch cable can slide through the clamp.



- Slide the Centralizer clamp down the cable towards the Pan-Tilt Control to flare the Centralizer Straps. The straps should be narrower than the smallest section of the bore you are going into. When the straps are spaced correctly, tighten the Centralizer Clamp firmly around the cable.



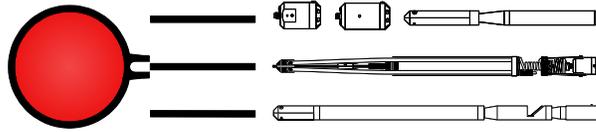
Plug in and turn on the winch. Turn on and off the lower light switch to control the camera's lights. Use the Joystick to tilt the camera up and down and to rotate it. Use the "Exposure" switch to change between "Normal" and "Center" exposure. Center exposure can be helpful if the center of the image appears dark. This can happen when the camera attempts to peer through a hole and into a void on the other side. Normal exposure is used in most other situations and will be the usual position for this switch.



Removing the camera from a Pan-Tilt Control

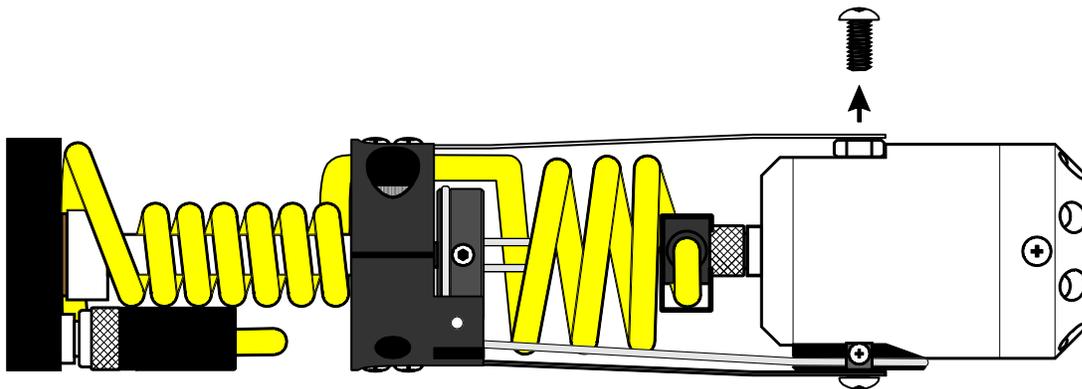
Attaching a camera to the Pan-Tilt Control is quite simple provided the camera was properly removed. To properly remove a camera from a Pan-Tilt Control, use the following procedure.

16. Set the Camera Select Switch on the winch to the “Pan-Tilt with Camera” position as shown.

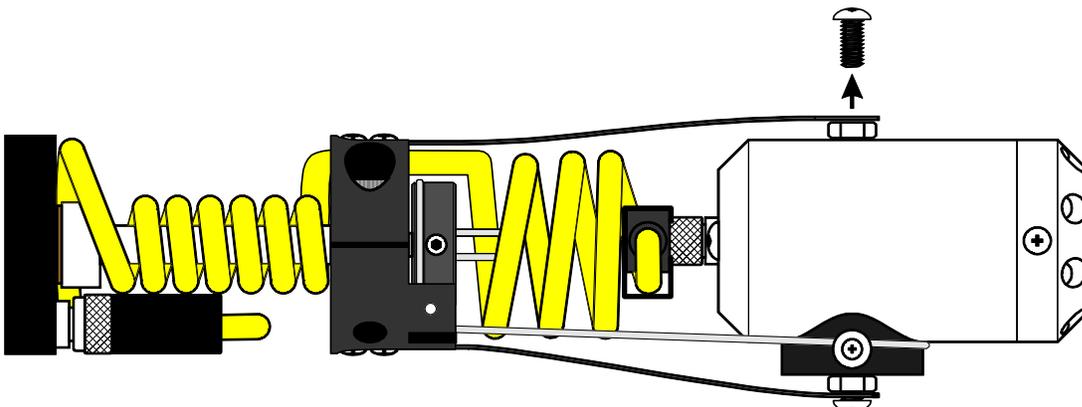


17. Turn on the winch. Using the joystick, rotate the control to the right until the camera stops moving and you can no longer hear the pan motor in the Pan-Tilt Control running.
18. Again, using the joystick, tilt the control down until the camera stops moving and you can no longer hear the tilt motor in the Pan-Tilt Control running. Turn off the winch.
19. Use the thin aluminum wrench that came with the system to loosen nut #9 from the camera body and remove both the nut and screw #8.

For a Standard Stainless Steel Camera, it will look like this.

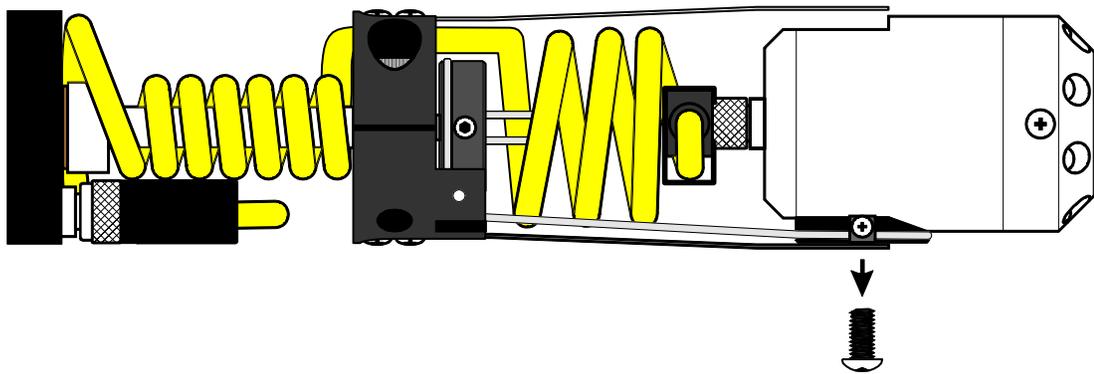


For a Standard Plastic Camera, it will look like this.

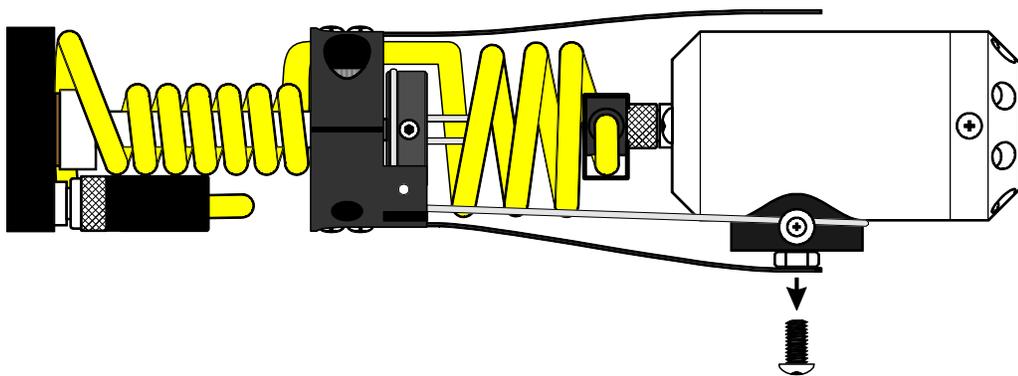


20. Remove screw #13. For a Standard Plastic Camera you will need to use the aluminum wrench as in step #4, for a Standard Stainless Steel Camera, there is no nut, so you will not need the wrench.

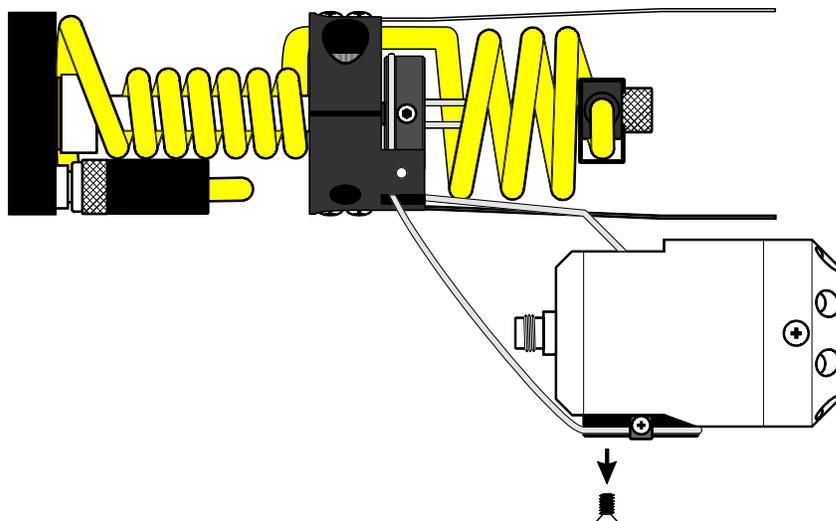
For a Standard Stainless Steel Camera, it will look like this.



For a Standard Plastic Camera, it will look like this.

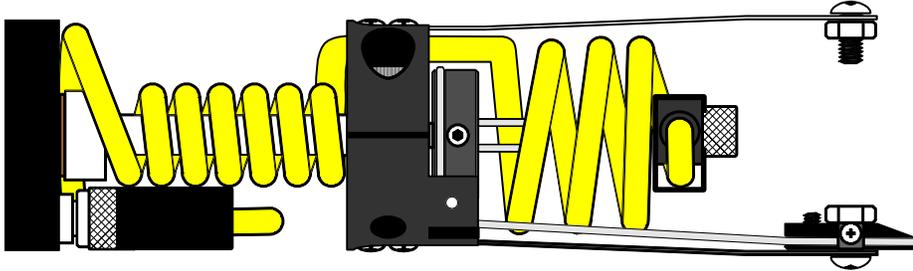


21. If you are removing a Standard Stainless Steel Camera, remove the Camera Tilt Pulley from the camera by removing screw #14.

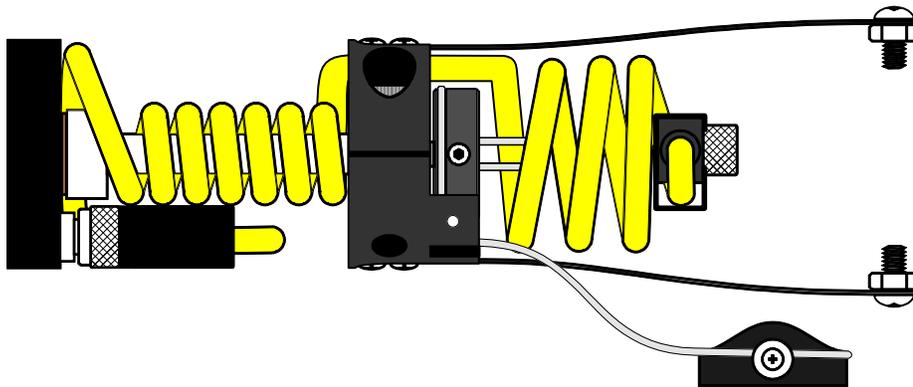


22. Reinstall screw #9 and its nut on the upper strap. If you are removing a Standard Stainless Steel Camera, pass screw #13 through the lower strap and then through the pulley and screw a #8-32 nut onto it, don't forget to place screw #14 in the pulley first, you will find an #8-32 nut in the spare parts that came with your system. For a Standard Plastic Camera, simply pass screw #13 through the lower strap and reinstall the nut to hold it in place.

For a Standard Stainless Steel Camera, it will look like this.



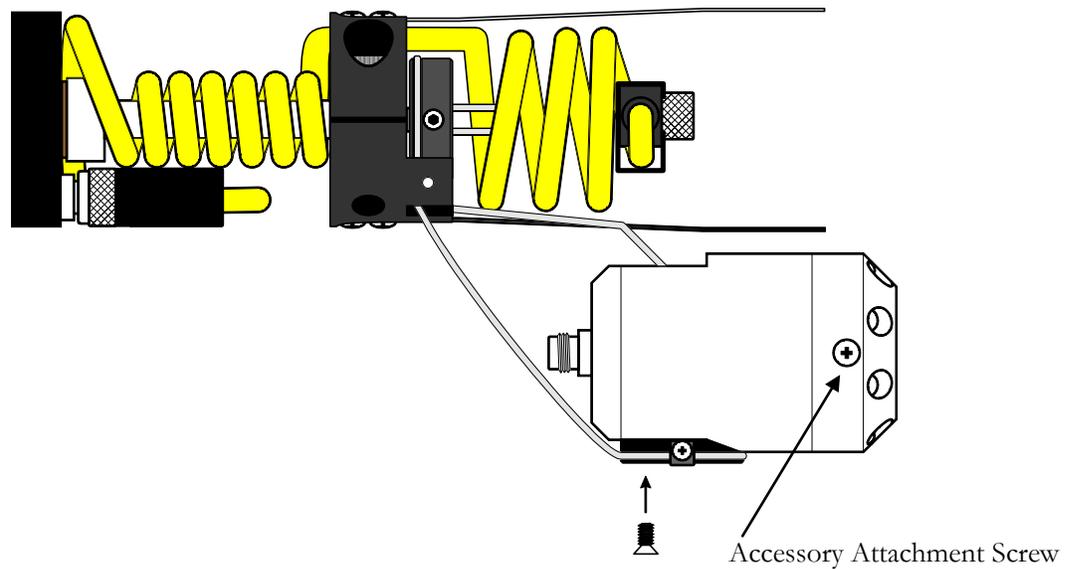
For a Standard Plastic Camera, it will look like this.



Reinstalling the camera on a Pan-Tilt Control

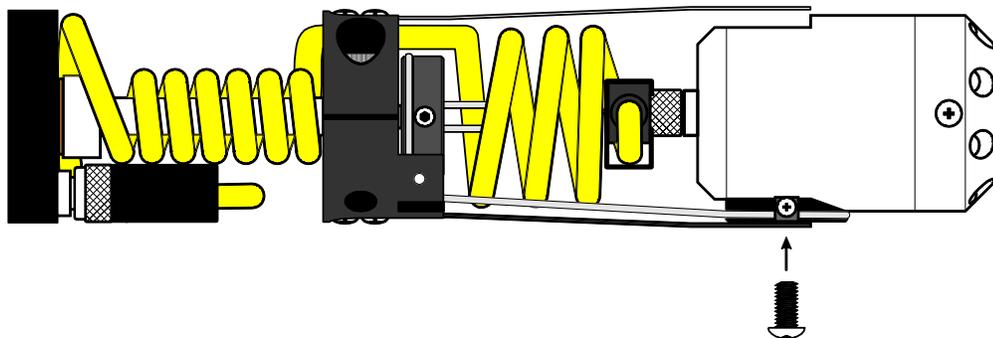
This section covers reattaching a camera that was removed using the above process. If your camera was not removed using the above procedure, skip ahead to the next section.

1. For a Standard Stainless Steel camera, screw the Camera Tilting Pulley to the side of the camera using screw #13. Be sure that the accessory attachment screw near the front of the camera is facing out as shown.

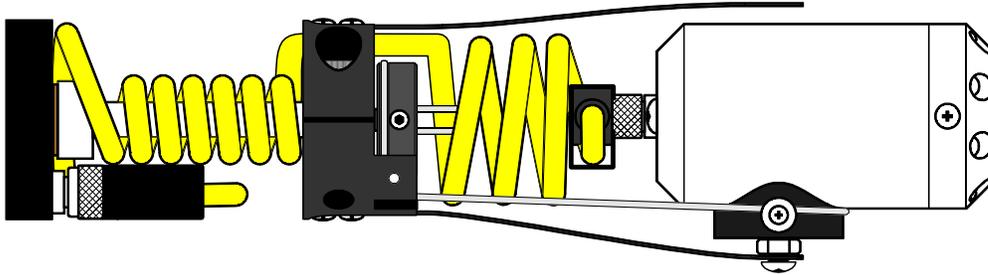


2. Place the camera between the Camera Mounting Straps #19. Align the holes in the yellow curled cord with the pins on the camera and using fingers only, tighten the yellow curled cord to the camera.

For a Standard Stainless Steel Camera, install screw #12 through the lower strap and the Camera Tilt Pulley and firmly into the camera body. Note that the camera's Accessory Attachment screw is facing out and the Tilt Pulley is on the bottom.

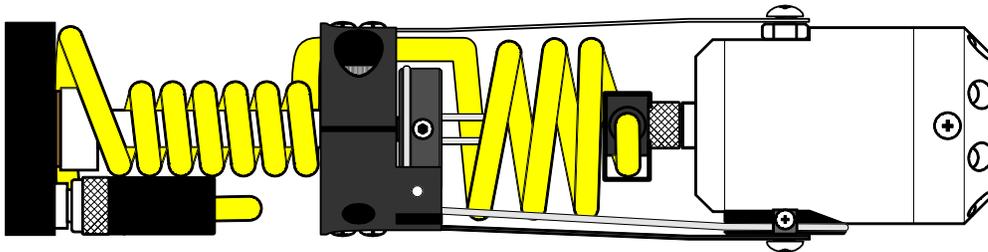


For a Standard Plastic Camera, install screw #12 through the lower strap, a #8 nut and into the camera. Note that the camera's Accessory Attachment screw is facing out and the Tilt Pulley is on the bottom. Tighten the screw so that the camera can rotate freely and yet the screw head is close to the camera body, then using the flat aluminum wrench that came with the system, tighten nut #8 to pinch the pulley against the camera body. Be very careful not to over tighten the nut and strip the threads.

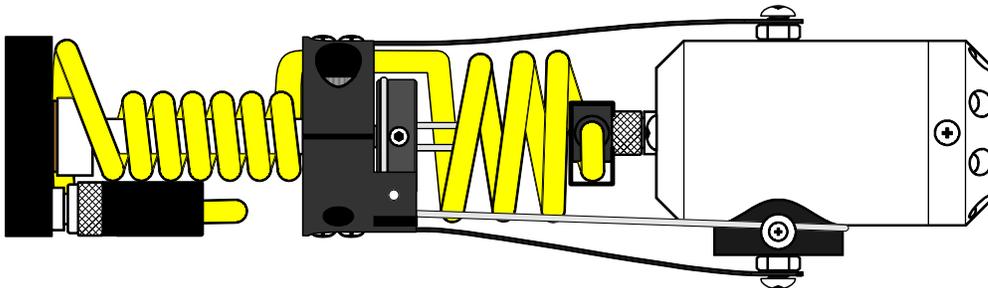


- Place nut #8 between the camera and the upper strap and install screw #7 through the strap and the nut and into the camera. Tighten the screw so that the camera can rotate freely and yet the screw head is close to the camera body. Using the flat aluminum wrench that came with the system, tighten nut #8 against the camera body. For Standard Plastic Cameras be very careful not to over tighten the nut and strip the threads.

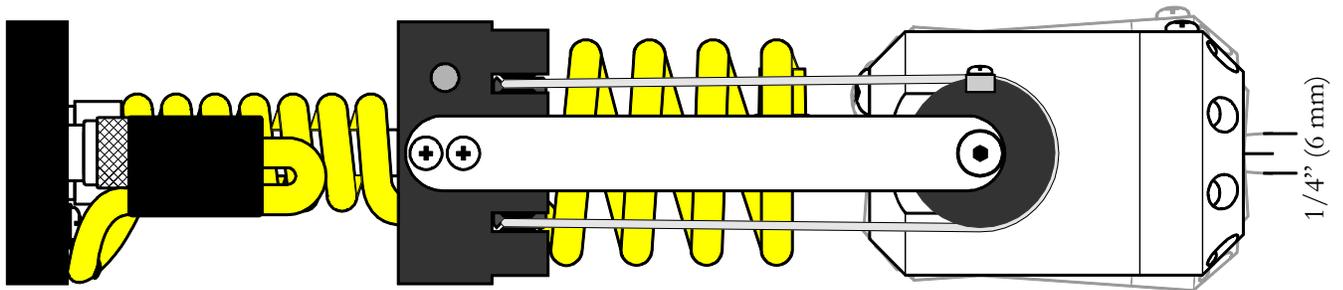
For a Standard Stainless Steel Camera it will look like this.



For a Standard Plastic Camera it will look like this.



4. If necessary, loosen the screw that clamps the ends of the tilt cord (#5) and adjust the tension of the cord so that the camera has approximately 1/4" of free play. When done correctly, the cord will be loose enough to allow the front of the camera to rotate approximately 1/4" (6 mm) by hand.

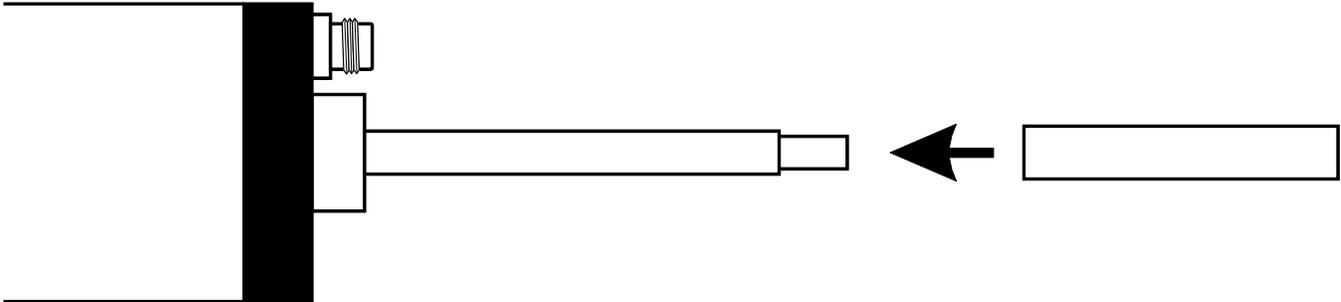


5. If necessary, loosen screw #11 that clamps the Tilt Cord to the Camera Tilt Pulley and rotate the camera so that it is aligned with the Camera Mounting Straps #19. Retighten the screw when the camera is properly aligned.

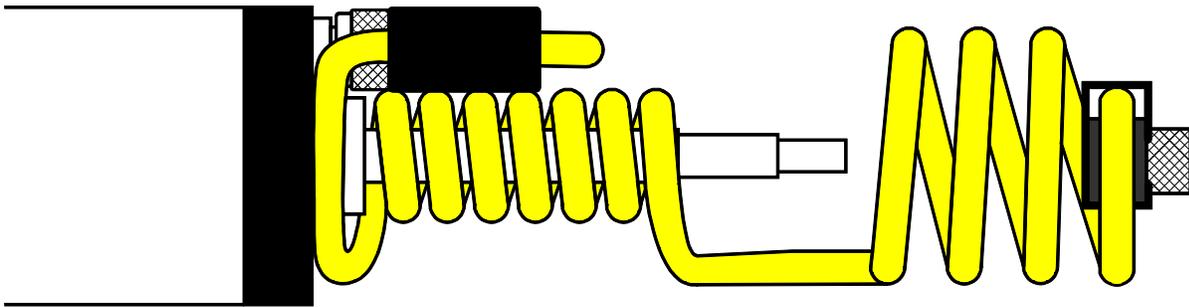
Reassembly of a Pan-Tilt Control

This section covers setting up a Pan-Tilt Control that has been completely stripped. While this is usually not the case, steps 4 through 9 are critical and need to be performed each time a camera is attached.

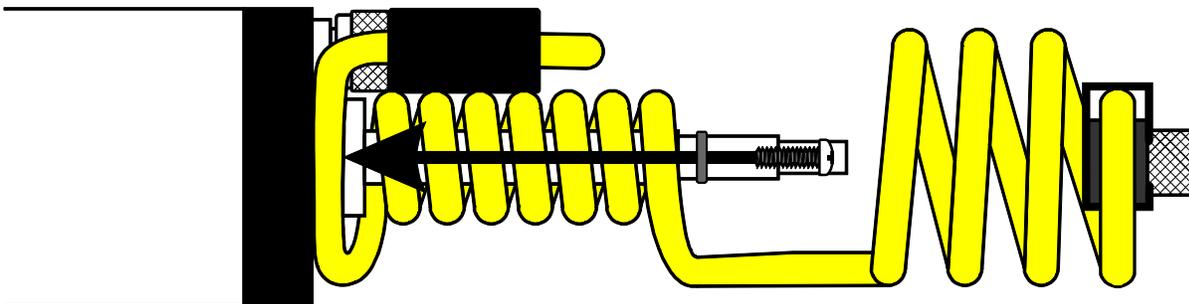
1. Slide the Spacer Tube #25 over the shaft of the Pan-Tilt Control.



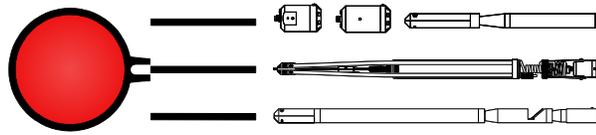
2. If necessary, lightly coat the pins on the front end of the Pan-Tilt Control with dielectric grease, slide the Curled Cord over the shaft and the spacer and screw the Curled Cord to the connector. Tighten the cord with fingers only, no tools.



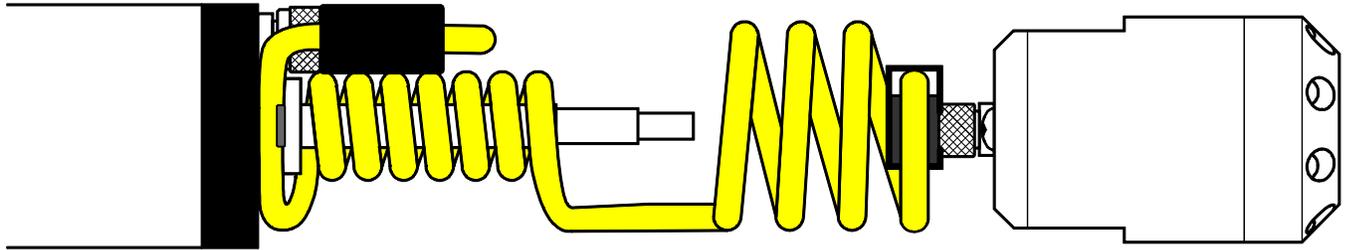
3. Clamp the Curled Cord in place with the Curled Cord Clamp #16 and screw #4.



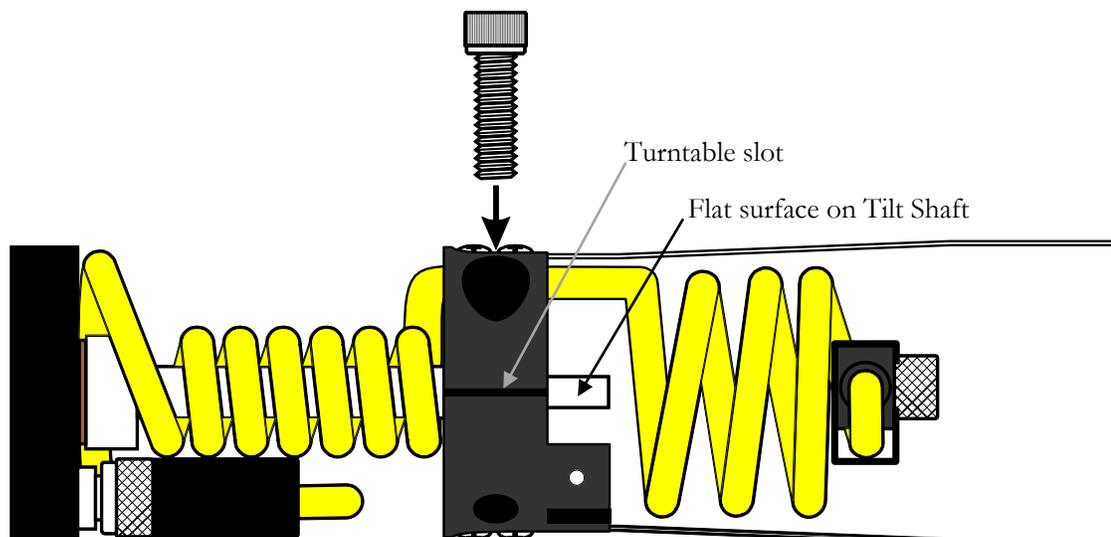
- Set the Camera Select Switch on the winch to the “Pan-Tilt with Camera” position as shown.



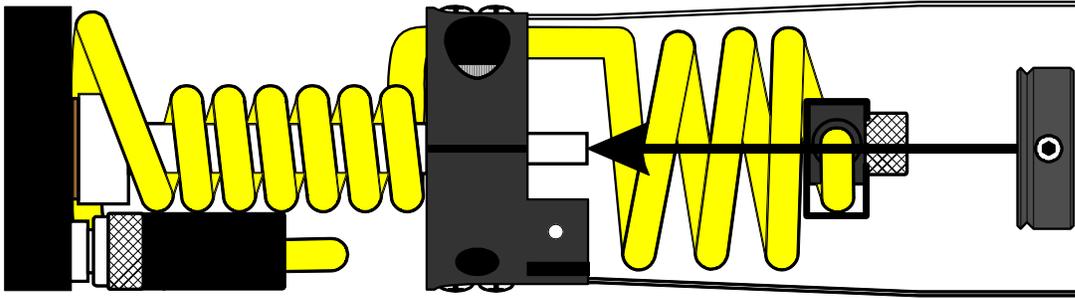
- Align the holes in the yellow Curled Cord with the pins in the camera and screw the two together. Do not attach the camera to the Pan-Tilt Control at this time.



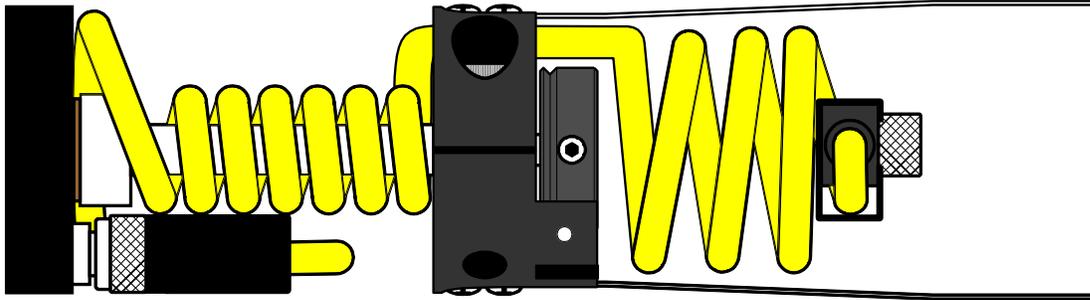
- Turn on the winch. Using the joystick, rotate the control to the right until the camera stops moving and you can no longer hear the pan motor in the Pan-Tilt Control running.
- Again, using the joystick, tilt the control down until the camera stops moving and you can no longer hear the tilt motor in the Pan-Tilt Control running.
- Turn off the power, and detach the camera from the yellow Curled Cord.
- Rotate the Pan-Tilt Control 180° so that the Curled Cord Connector is down. Slide the turntable over the shaft and down against the spacer tube #25. Rotate the turntable so that the slot in the Turntable is perpendicular to the flat surface on the Tilt Shaft. Carefully match the image below and then attach the Turntable to the Pan Shaft by tightening screw #7.



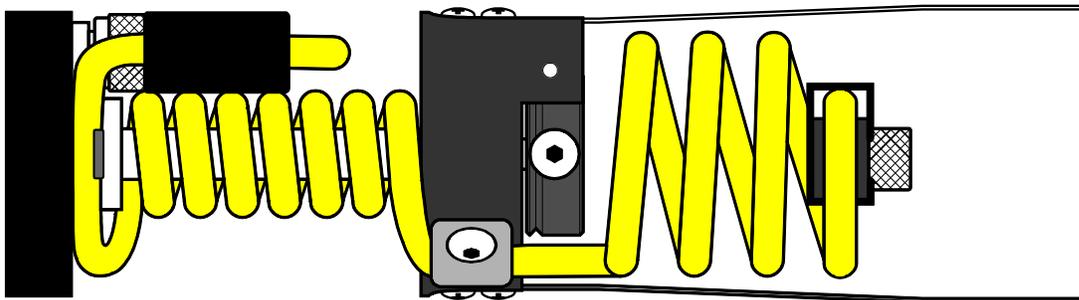
10. Slide the Tilt Shaft Pulley #21 over the Tilt Shaft with the Tilt Cord Clamping Screw #11 facing away from you.



11. Position the Tilt Shaft Pulley so that there is a small, but visible gap between the pulley and the Turntable. Tighten screw #10 (the one on the opposite side of the pulley from the Tilt Cord Clamping Screw #11) onto the flat part to the tilt shaft.

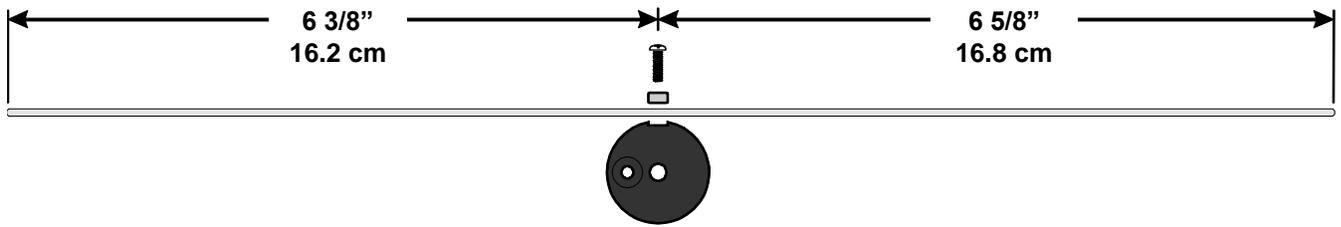


12. Loosen the Turntable Clamping Screw #7, rotate the turntable so that you have access to the second set screw #10 in the Tilt Shaft Pulley and tighten it down on the Tilt Shaft. Rotate the turntable back to the position shown above and retighten screw #7 to clamp the Turntable in place once again.
13. Rotate the Pan-Tilt Control 180° and clamp the Curled Cord to the turntable using the Turntable Cord Clamp #17 and screw #6.

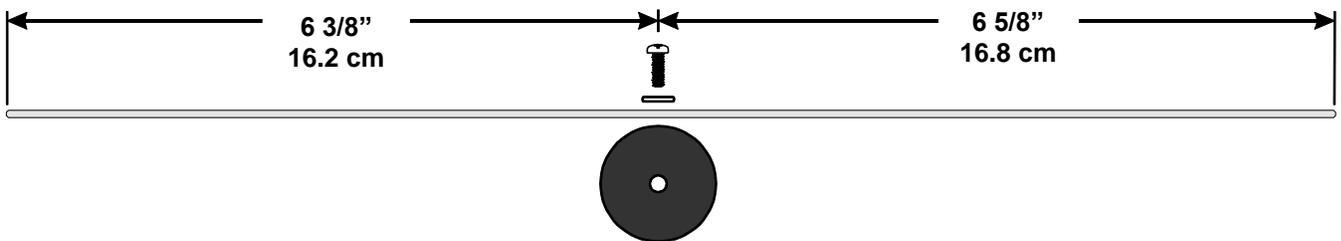


- Clamp the Tilt Cord to the Camera Tilt Pulley as shown below, the measurements are approximates and will be fine tuned later..

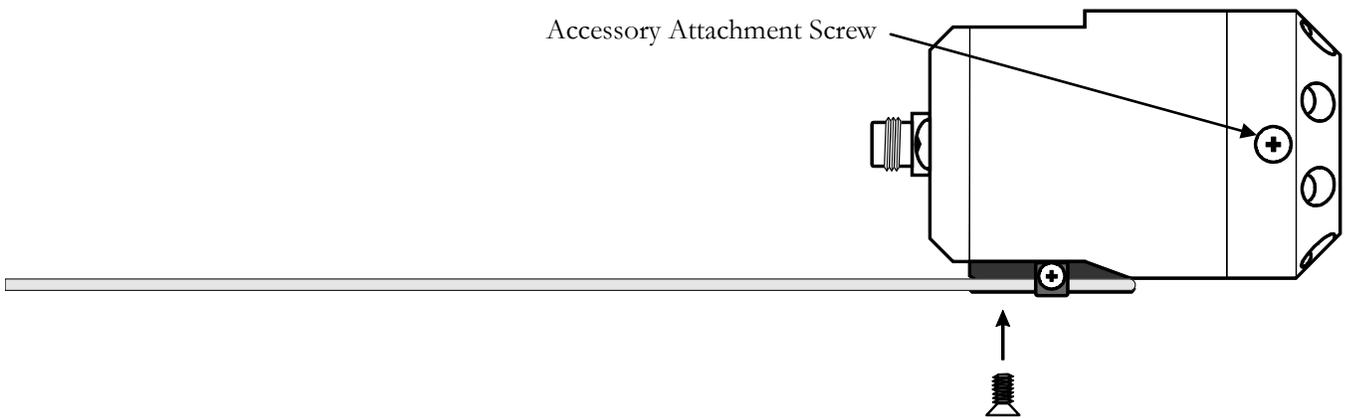
A Standard Stainless Steel Camera uses a #2-56 x 5/16" screw and a Tilt Cord Clamp, it will look like this.



A Standard Plastic Camera uses a #4-40 x 5/16" screw and a #4 washer, it will look like this.

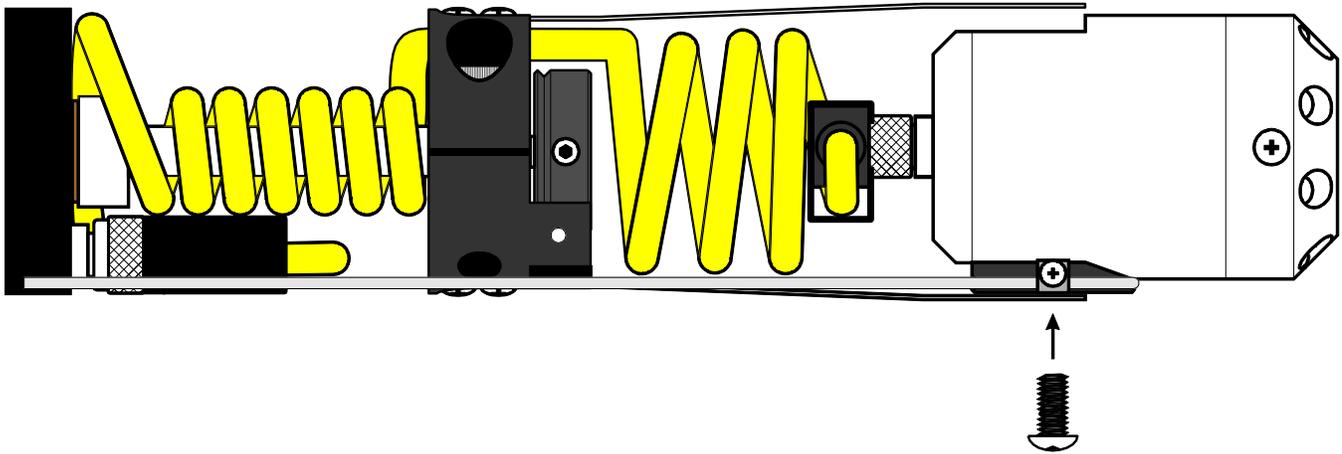


- For a Standard Stainless Steel Camera, use screw #14 to attach the Camera Tilt Pulley to the side of the camera. Note the position of the Accessory Attachment Screw on the front of the camera.

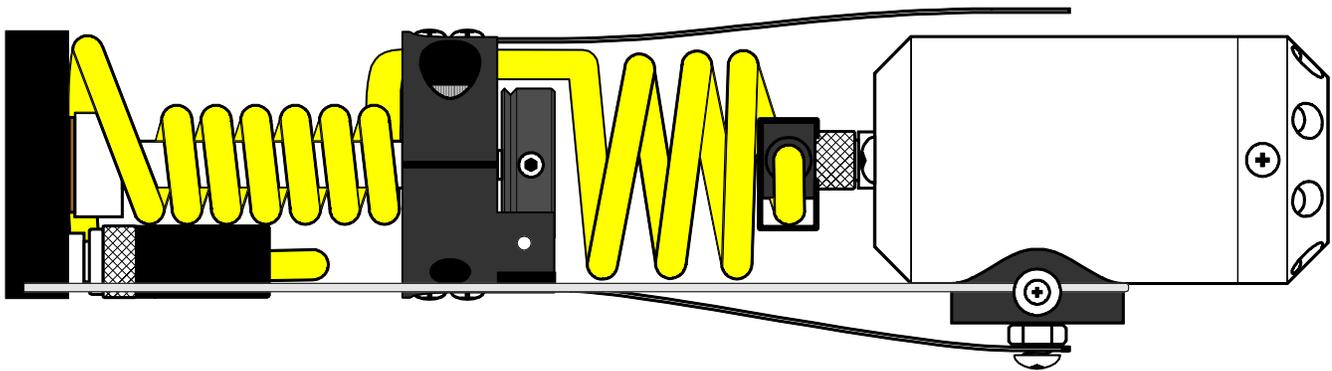


- Place the camera between the Camera Mounting Straps #20. Align the holes in the yellow curled cord with the pins on the camera and using fingers only, tighten the yellow curled cord to the camera. Attach the camera and the Camera Tilt Pulley to the Pan-Tilt Control.

For a Standard Stainless Steel Camera, install screw #13 through the lower strap and the Camera Tilt Pulley and firmly into the camera body.

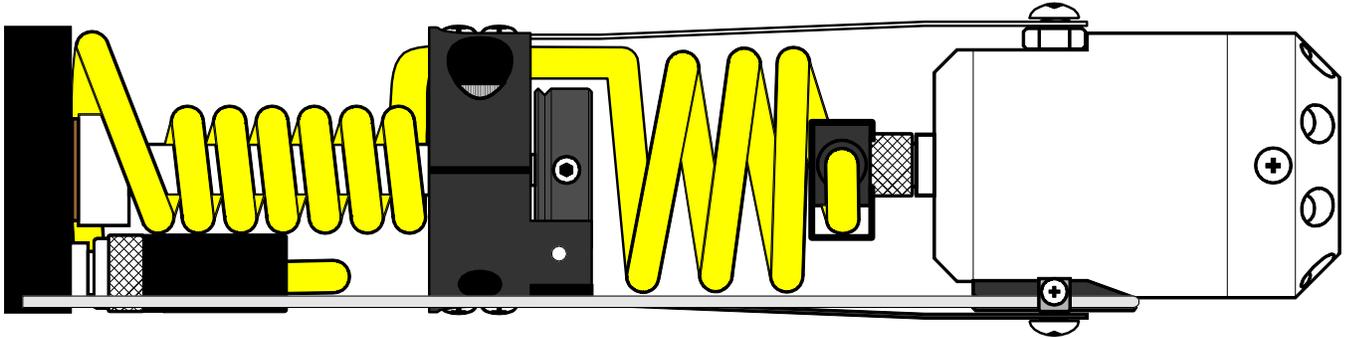


For a Standard Plastic Camera, install screw #13 through the lower strap, a #8-32 nut and into the camera. Tighten the screw so that the camera can rotate freely and yet the screw head is close to the pulley body, then, using the flat aluminum wrench that came with the system, tighten the nut to pinch the pulley against the camera body. Be very careful not to over tighten the nut and strip the threads in the camera body.

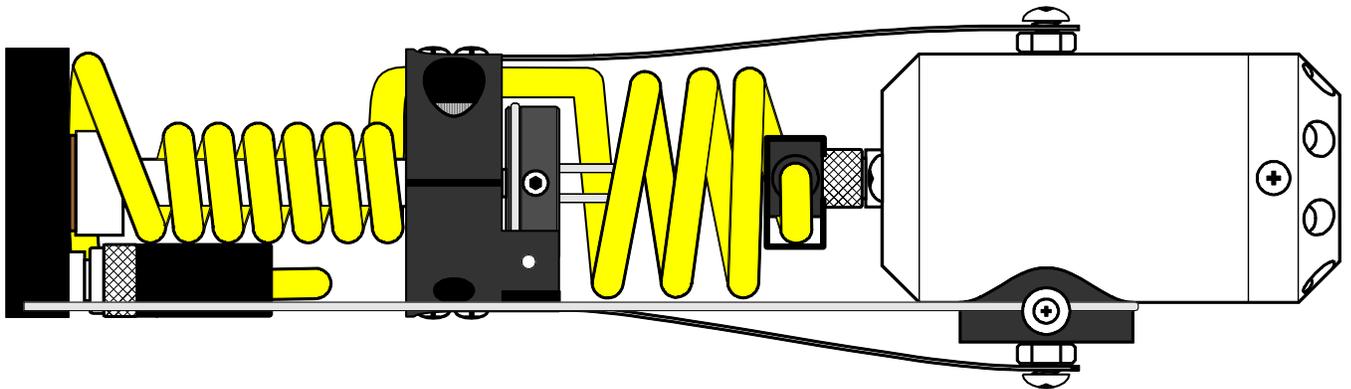


- Place nut #9 between the camera and the upper strap and install screw #8 through the strap and the nut and into the camera. Tighten the screw so that the camera can rotate freely and yet the screw head is close to the camera body, then using the flat aluminum wrench that came with the system, tighten nut #8 against the camera body. For Standard Plastic Cameras, be very careful not to over tighten the nut, as this can strip the threads in the camera body.

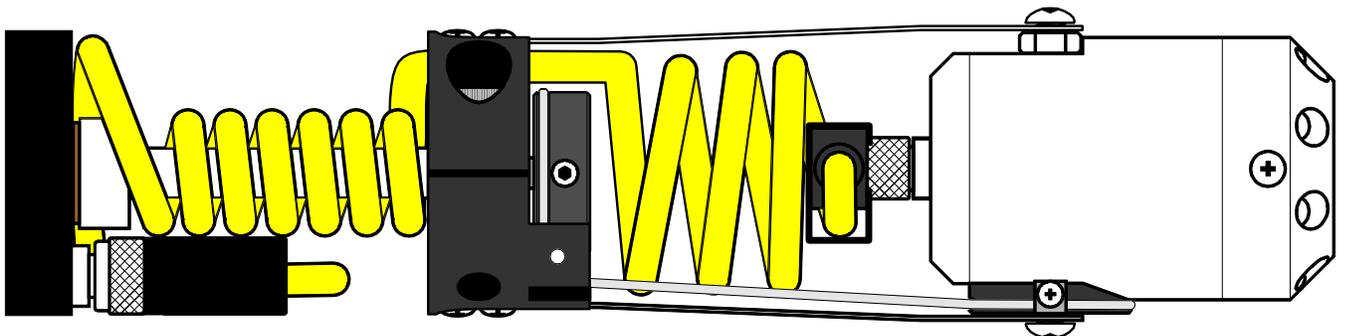
For a Standard Stainless Steel Camera it will look like this.



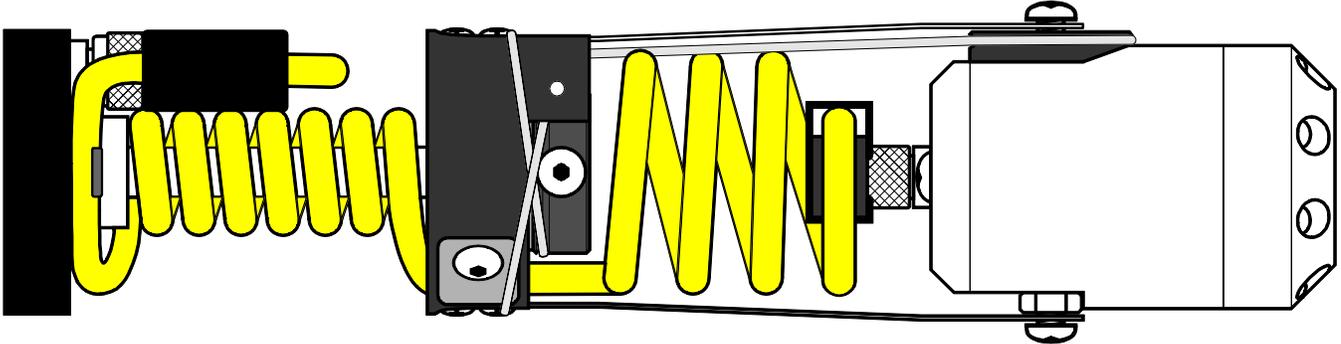
For a Standard Plastic Camera it will look like this.



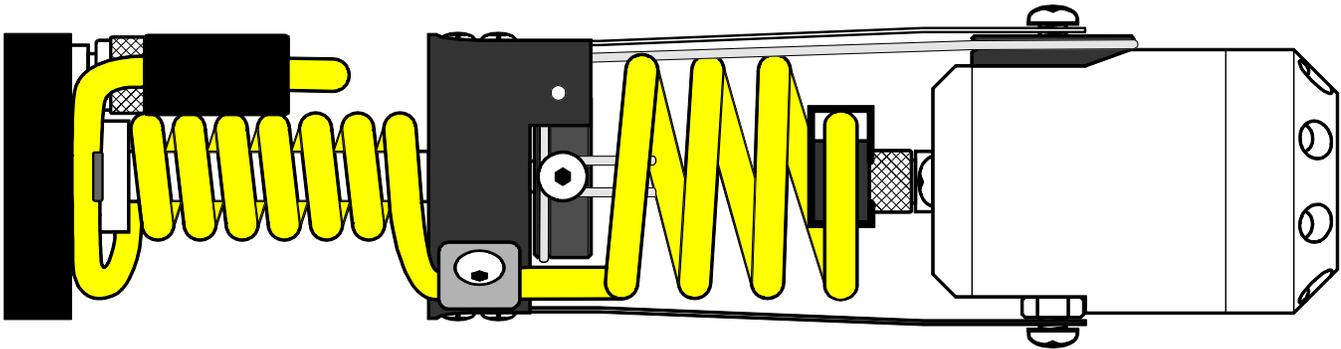
- Pass the ends of the cord between the turntable and the small Tilt Pulleys and then wrap them around the Tilt Shaft Pulley.



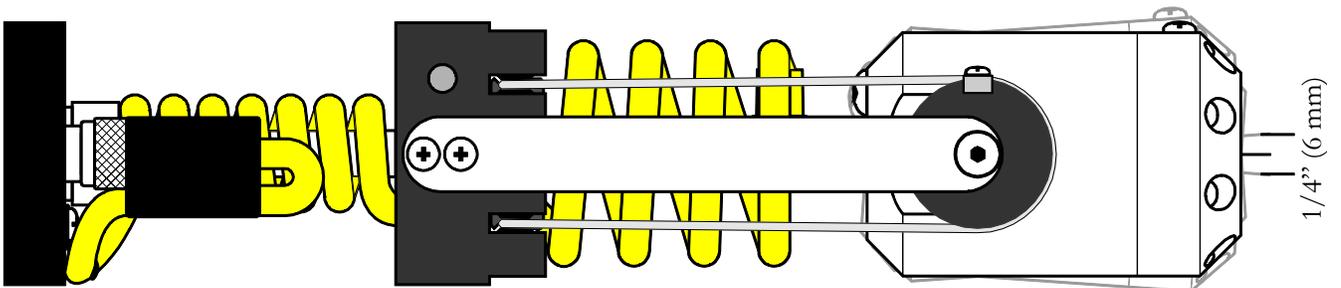
19. Turn the entire assembly over, loosen the Cord Clamping Screw #11 and cross the two ends of the cord under the screw.



20. Lift the ends of the cord toward the camera. This will wrap each end around the screw. Pull the ends so that they are even and then tighten the clamping screw to hold them in place.



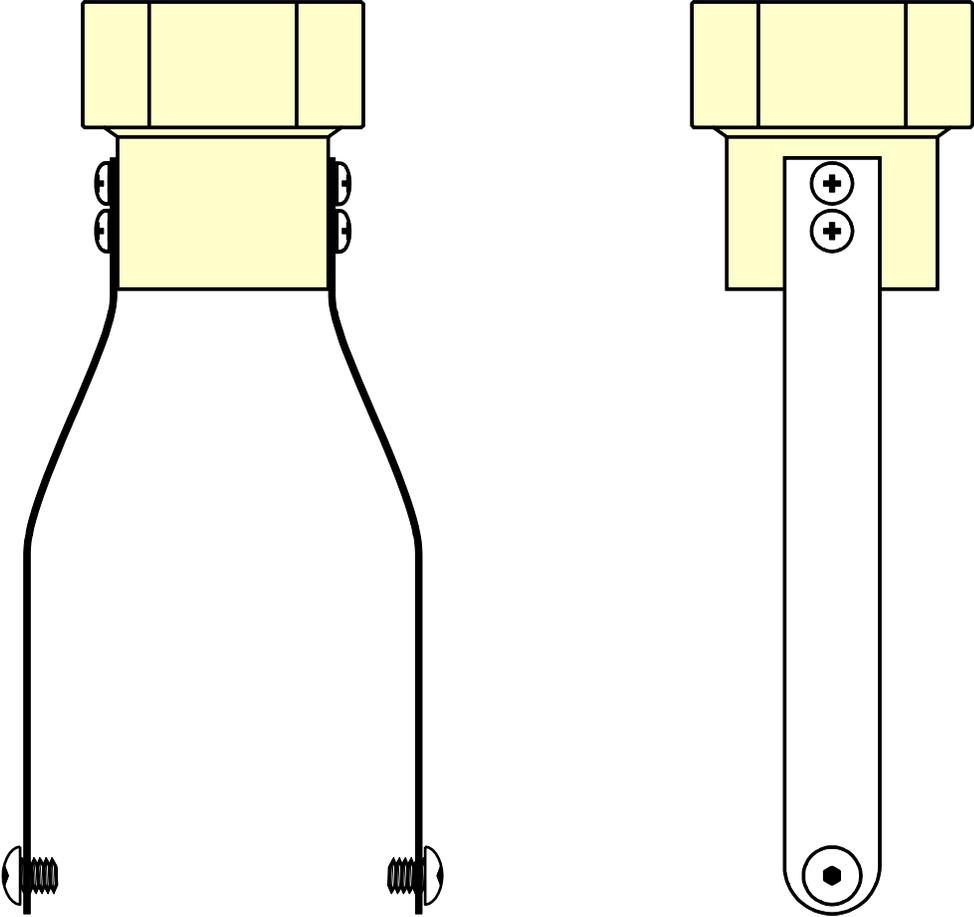
21. When performed correctly, the cord will be loose enough to allow the front of the camera to rotate approximately 1/4" (6 mm) by hand.



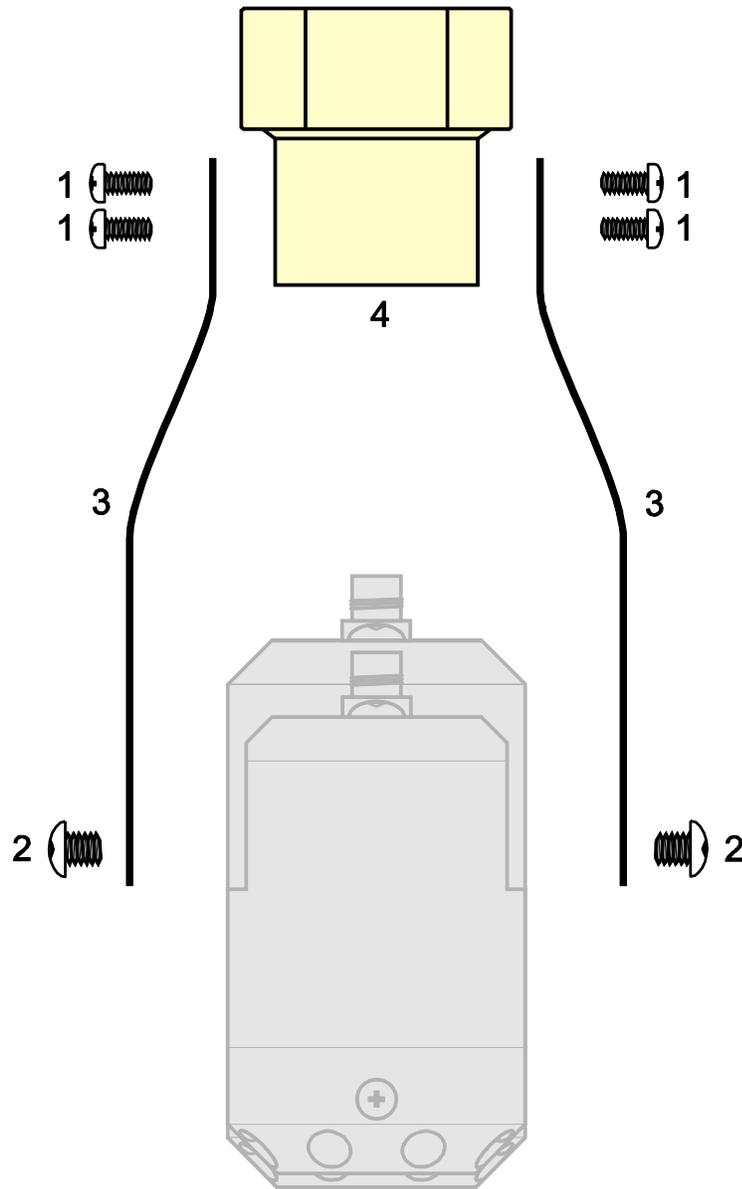
22. If necessary, loosen the screw that clamps the Tilt Cord to the Camera Tilt Pulley (screw #12) and rotate the camera so that it is aligned with the Camera Mounting Straps #20. Retighten the screw when the camera is properly aligned.

Appendix H

Fixed Camera Mount



Fixed Camera Mount Exploded View

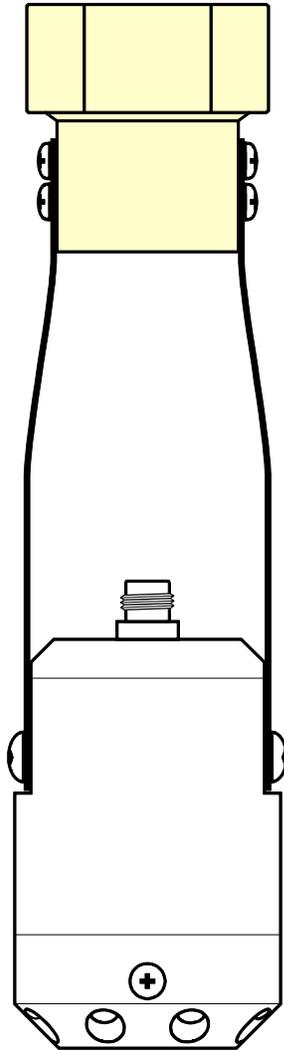


- 1) MP-0153 - #4-40 x 1/4" Stainless Steel Screw
- 2) MP-0110 - #8-32 x 3/16" Stainless Steel Screw
- 3) GVJR-1110 - Mounting Straps
- 4) GVJR-1193 CPVC Female Adapter

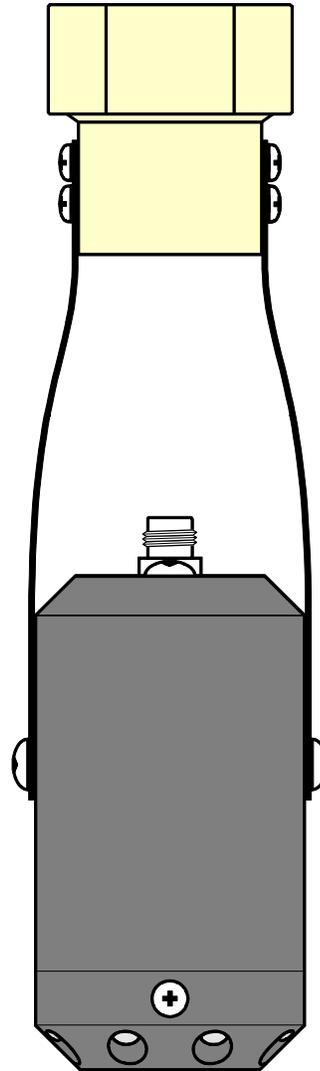
The Fixed Camera Mount allows you to mount the camera in a fixed position. It can be used with either the plastic or Standard Stainless Steel Camera and is the most commonly used mount for these cameras.

The Fixed Camera Mount comes mounted on the camera. There are two screws that join the camera to the mount, #2 in the exploded view on the previous page. Be very careful when tightening these screws on a plastic camera, over tightening can strip the threads out of the camera body resulting in a costly repair. If desired, the camera can be mounted at an angle rather than pointing straight down the bore.

**Fixed Camera Mount with a
Standard Stainless Steel camera**

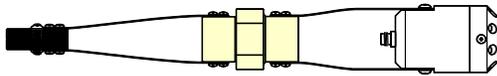


**Fixed Camera Mount with a
Plastic camera**

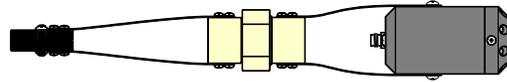


The Fixed Camera Mount must be used with a Cable Support Clamp. Attach the Cable Support Clamp directly to the Fixed Camera Mount, or to a centralizer which is then connected to the Fixed Camera Mount.

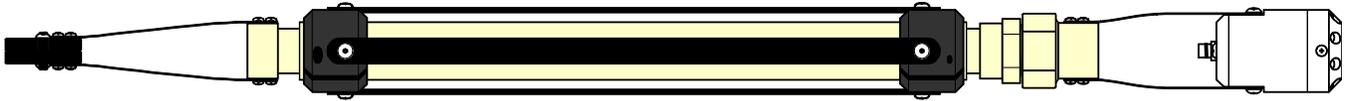
Standard Stainless Steel Camera with Cable Support Clamp



Plastic camera with Cable Support Clamp



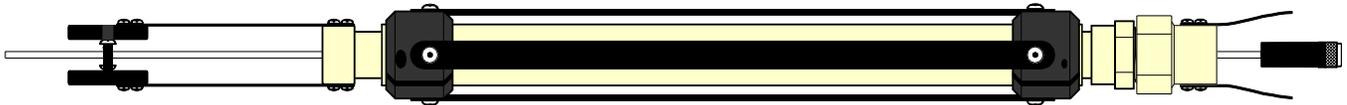
Standard Stainless Steel camera with Centralizer and Cable Support Clamp



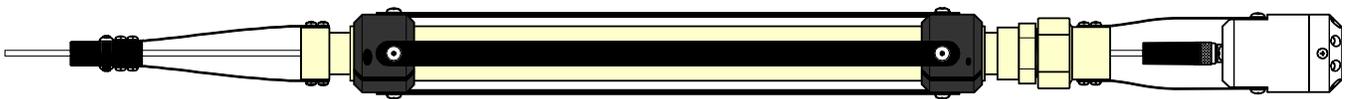
Plastic camera with Centralizer and Cable Support Clamp



Loosen the two large screws that hold the two halves of the Cable Support Clamp together and slide the clamp open. Pass the winch cable and connector through the clamp (and centralizer if attached) and up to the back of the camera.

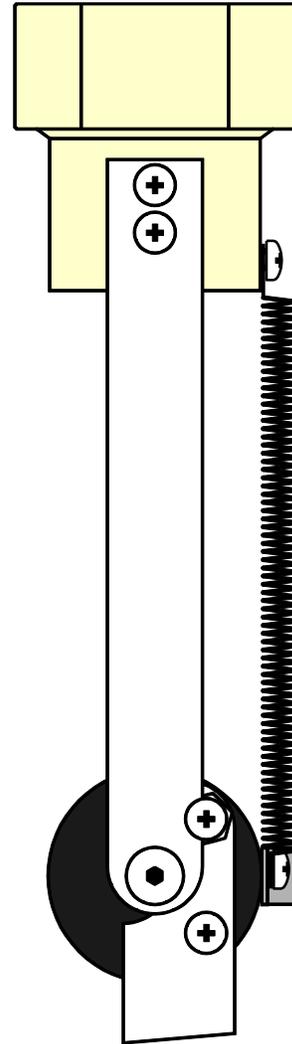
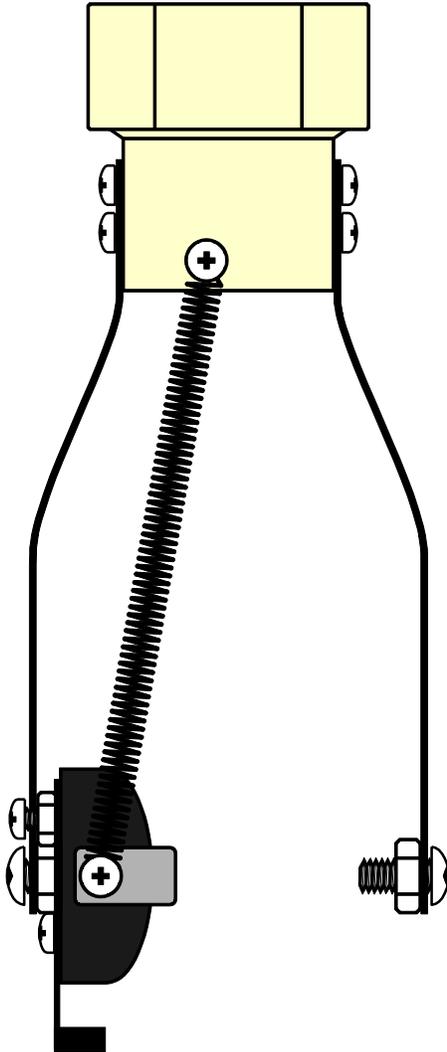


Lightly coat the pins in the camera connector with silicone grease. Align the holes on the winch cable with the pins in the connector and screw the two together by turning the knurled metal nut on the cable connector. Tighten the nut finger tight only. Slide the two halves of the Cable Support Clamp together around the cable and tighten the clamping screws.

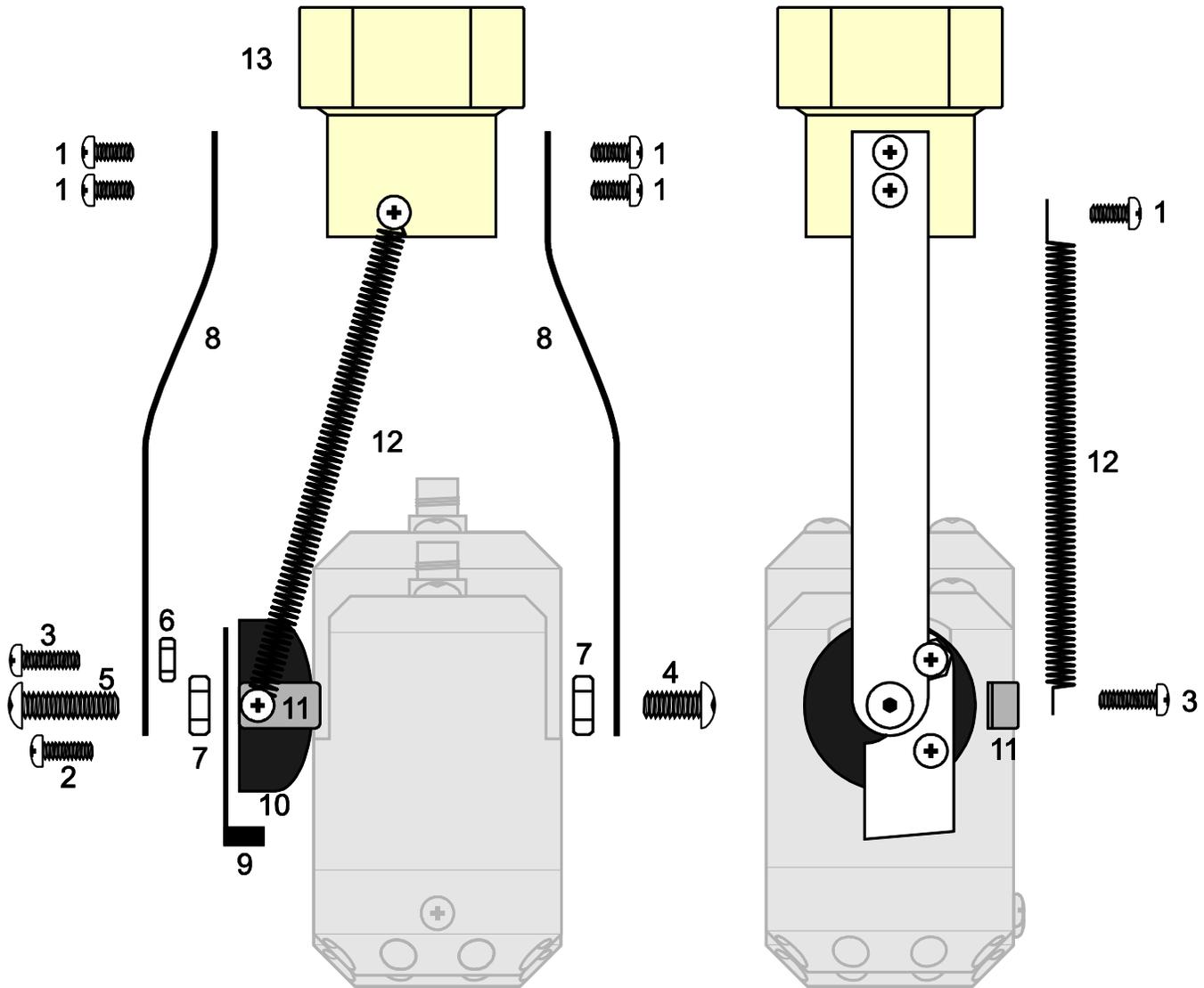


Appendix I

Tilting Camera Mount



Tilting Camera Mount Exploded View



- 1) MP-0153 - #4-40 x 1/4" Stainless Steel Screw
- 2) MP-0110 - #4-40 x 5/16" Stainless Steel Screw
- 3) MP-0502 - #4-40 x 3/8" Stainless Steel Screw
- 4) MP-0189 - #8-32 x 3/8" Stainless Steel Screw
- 5) MP-0152 - #8-32 x 5/8" Stainless Steel Screw
- 6) MP-0141 - #4-40 Stainless Steel Nut
- 7) MP-0017 - #8-32 Stainless Steel Nut

- 8) GVJR-1110 - Mounting Straps
- 9) GVJR-1002 - Cable Guide
- 10) GVJR-0002 - Tilt Pulley
- 11) GVJR-1147 - Cable Clamp
- 12) MP-0186 - Spring
- 13) GVJR - 1193 CPVC Female Adapter

The Tilting Camera Mount is designed for use with a pipe-string when rotating and tilting the camera are required. It can be used with either a plastic or Standard Stainless Steel camera.

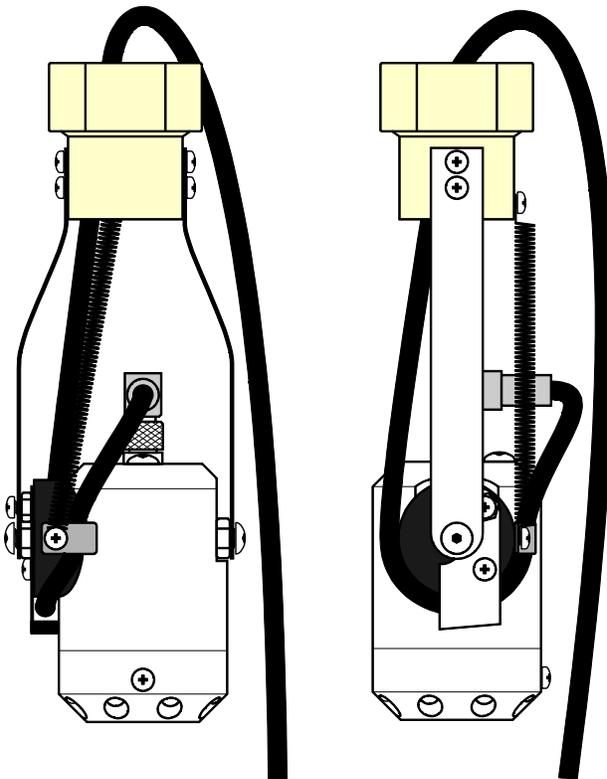
The Tilting Camera Mount comes fully assembled and ready for the camera. There are two screws that join the camera to the mount, #4 and #5 in the exploded view on the previous page. Before mounting the camera, be sure that the female end of the 1-meter cable is near the back of the camera and that the cable is under the Cable Clamp (#11) and passes between the Tilt Pulley (#10) and the Cable Guide (#9). Carefully screw the two mounting screws (#3) into the holes in the body of the camera. Loosen or tighten the jam nuts (#7) so that the head of each screw is almost against the Mounting Strap (#8) and then gently tighten the nut against the body of the camera. Be very careful when tightening these nuts on a plastic camera, over tightening can strip the threads out of the camera body resulting in a costly repair. When done correctly, there will be just enough space between the screw head and the nut not to bind the strap; the camera will tilt up freely and the spring will easily rotate the camera back to the down-looking position.

Check that the Tilt Stop screw (#3) stops the camera in the straight down position. When installed correctly, the Mounting Strap (#8) touches the body of the Tilt Stop screw between the jam nut (#6) and the screw head. If necessary, adjust the Tilt Stop screw and its jam nut so that they work as described above.

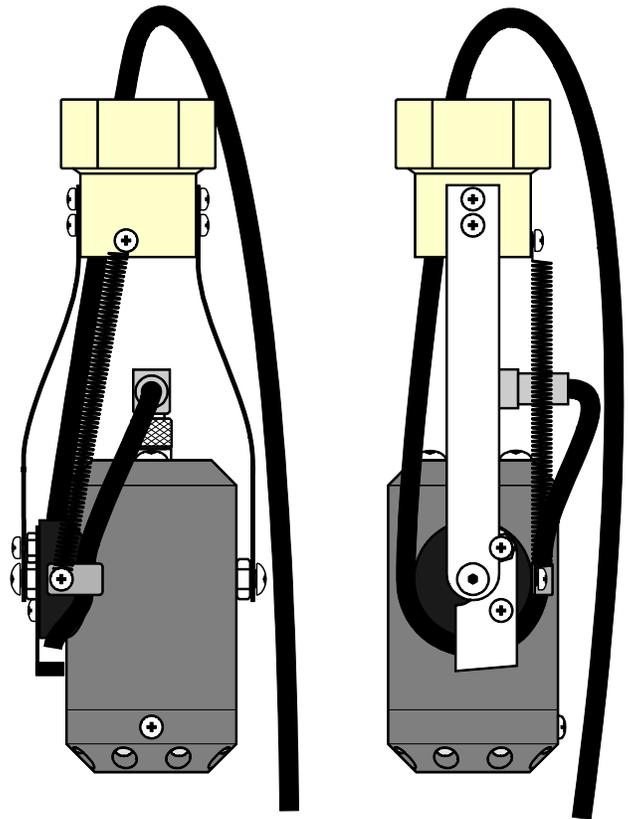
When the camera is tilting freely and stopping correctly, connect the 1-meter flexible cable.

Lightly coat the pins in the camera connector with silicone grease. Align the holes on the 1-meter cable with the pins in the connector and screw the two together by turning the knurled metal nut on the cable's connector. Tighten the nut finger tight only. Clamp the cable under the Cable Clamp (#11), wrap it around the pulley (#10) and pass it out through the 3/4" fitting on the end of the Manual Tilt Head (#13).

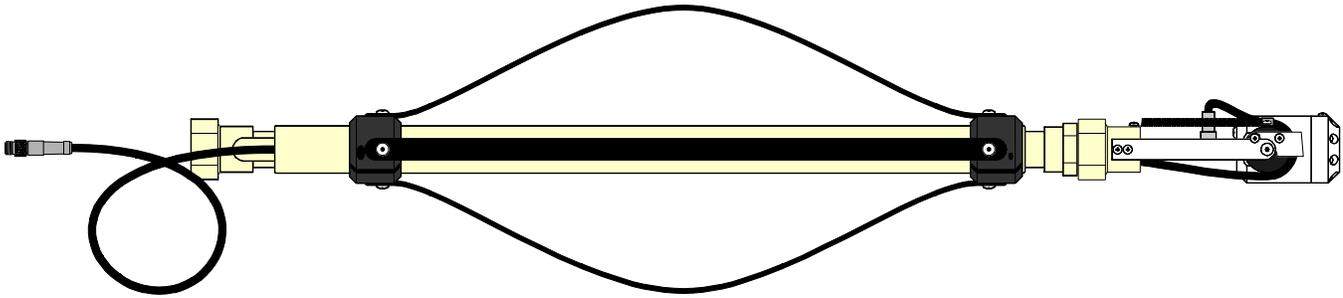
**Tilting Camera Mount with
Standard Stainless Steel camera**



**Tilting Camera Mount with
Plastic Camera**



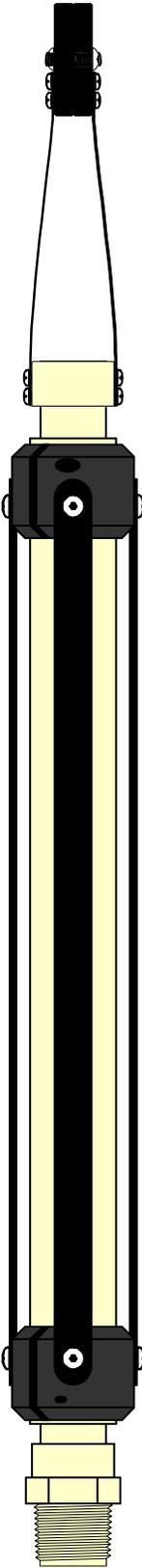
Pass the male end of the flexible cable through the bottom of the Centralizer and out through the hole in the side. Lightly coat the pins in the camera's connector with silicone grease and Screw the Centralizer to the tilting Camera mount.



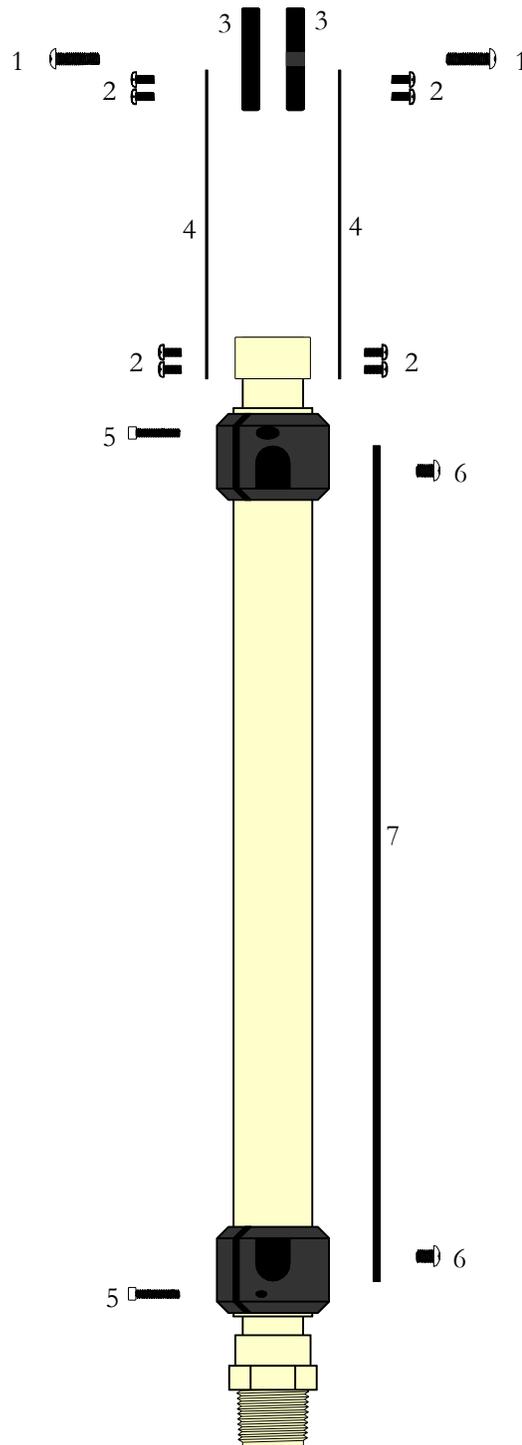
Lightly coat the pins in the 1-meter cable with silicone grease. Align the holes on the winch cable with the pins in the 1-meter cable and screw the two together by turning the knurled metal nut on the cable connector. Tighten the nut finger tight only. Begin building the pipe-string and lowering the camera down the bore. Pull on and release the winch cable to tilt the camera up and down and rotate the pipe-string to rotate the camera.

Appendix J

Standard Centralizer

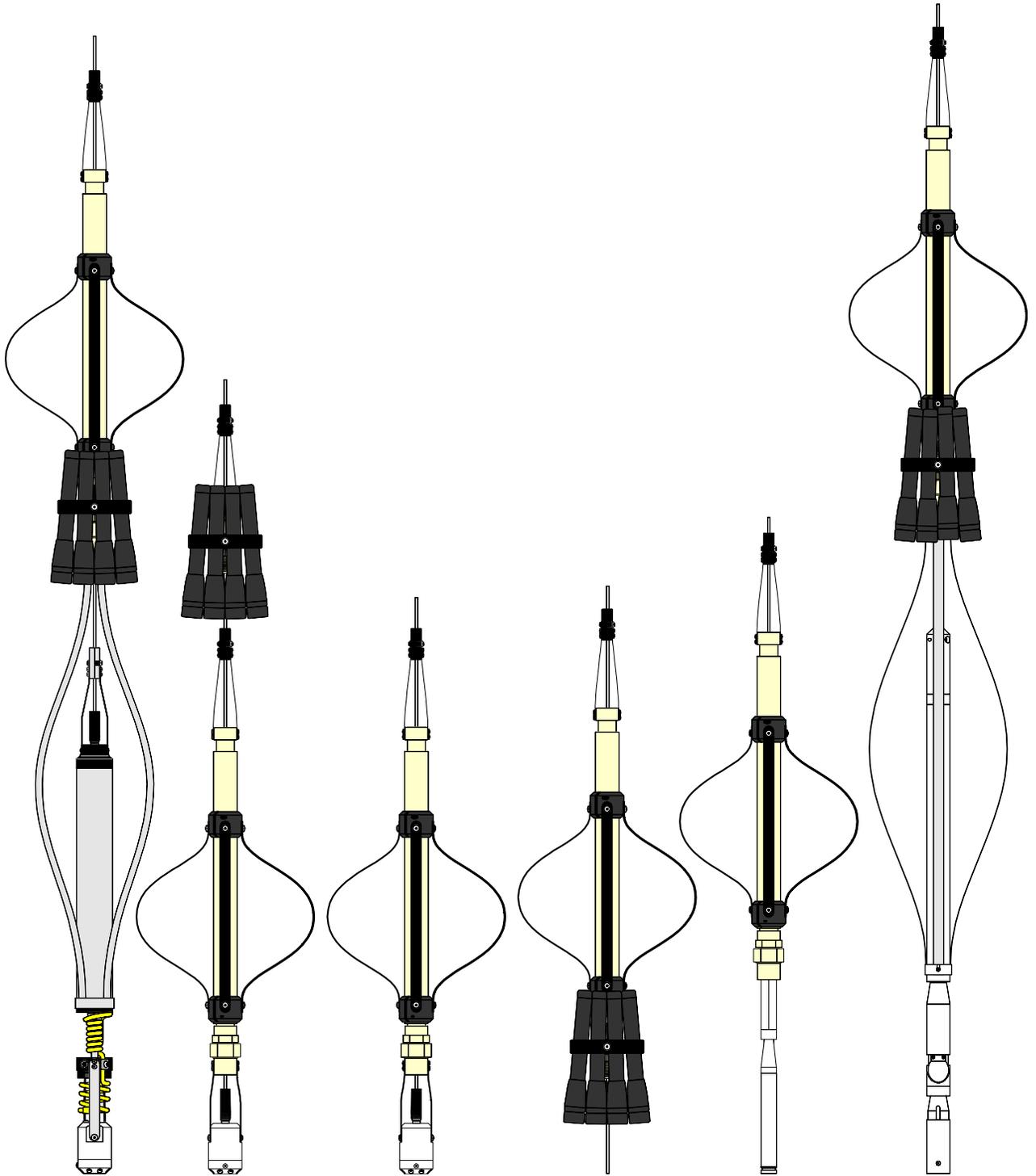


Centralizer Exploded View



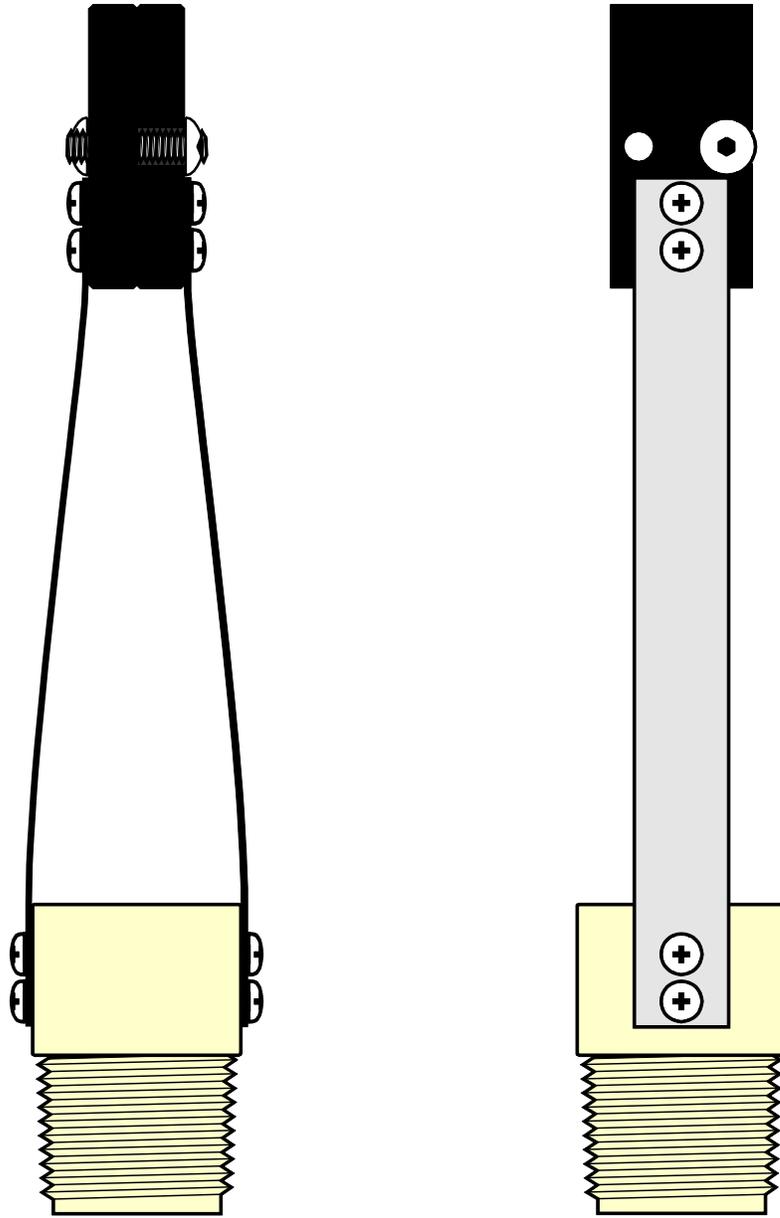
- 1) MP-0152
- 2) MP-0153 #4-40 x 1/4 Stainless Steel Cap Screw
- 3) GVJR-1001 Plastic Clamp
- 4) GV-0014 Stainless Clamp Strap
- 5) MP-1712 #4-40 x 5/8 Stainless Steel Socket Head Cap Screw
- 6) MP-0135 #8-32 x 1/4 Stainless Steel Cap Screw
- 7) GVJR-1348 Standard Centralizer Strap

The Centralizer is used to keep the camera and lights away from the walls of the bore. It should always be used with a Cable Support Clamp unless it is attached to a pipe-string. The Centralizer can be used in combination with many system components, some examples are shown below.

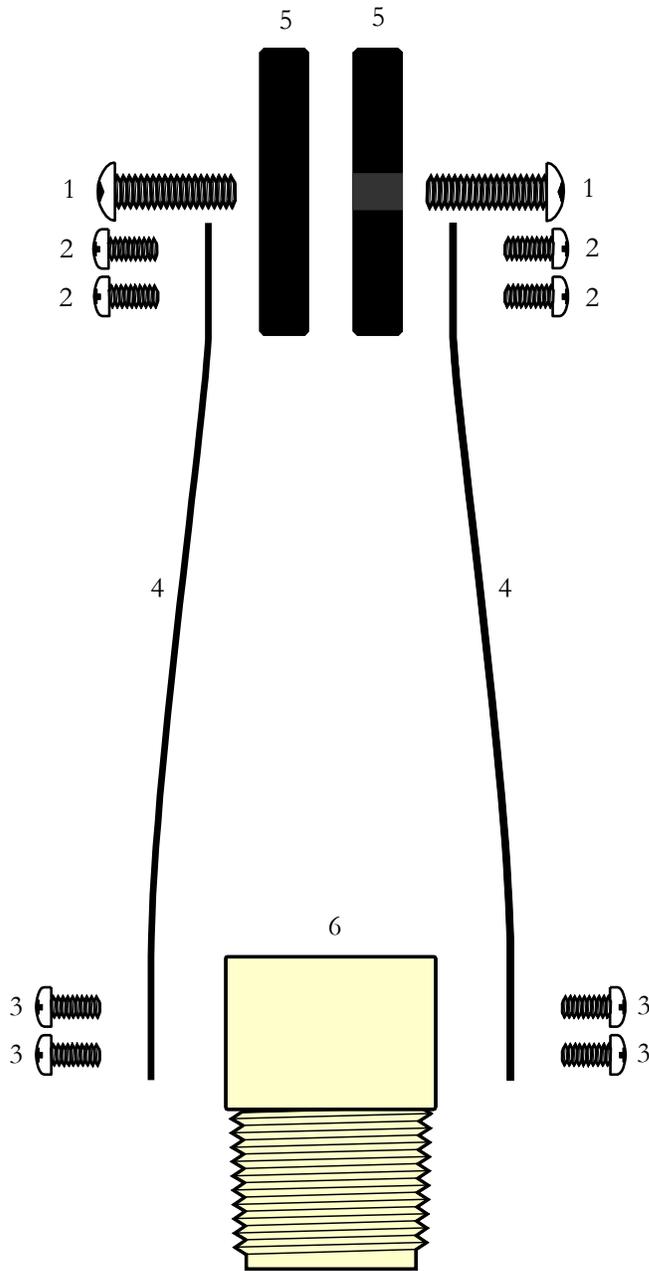


Appendix K

Cable Support Clamp

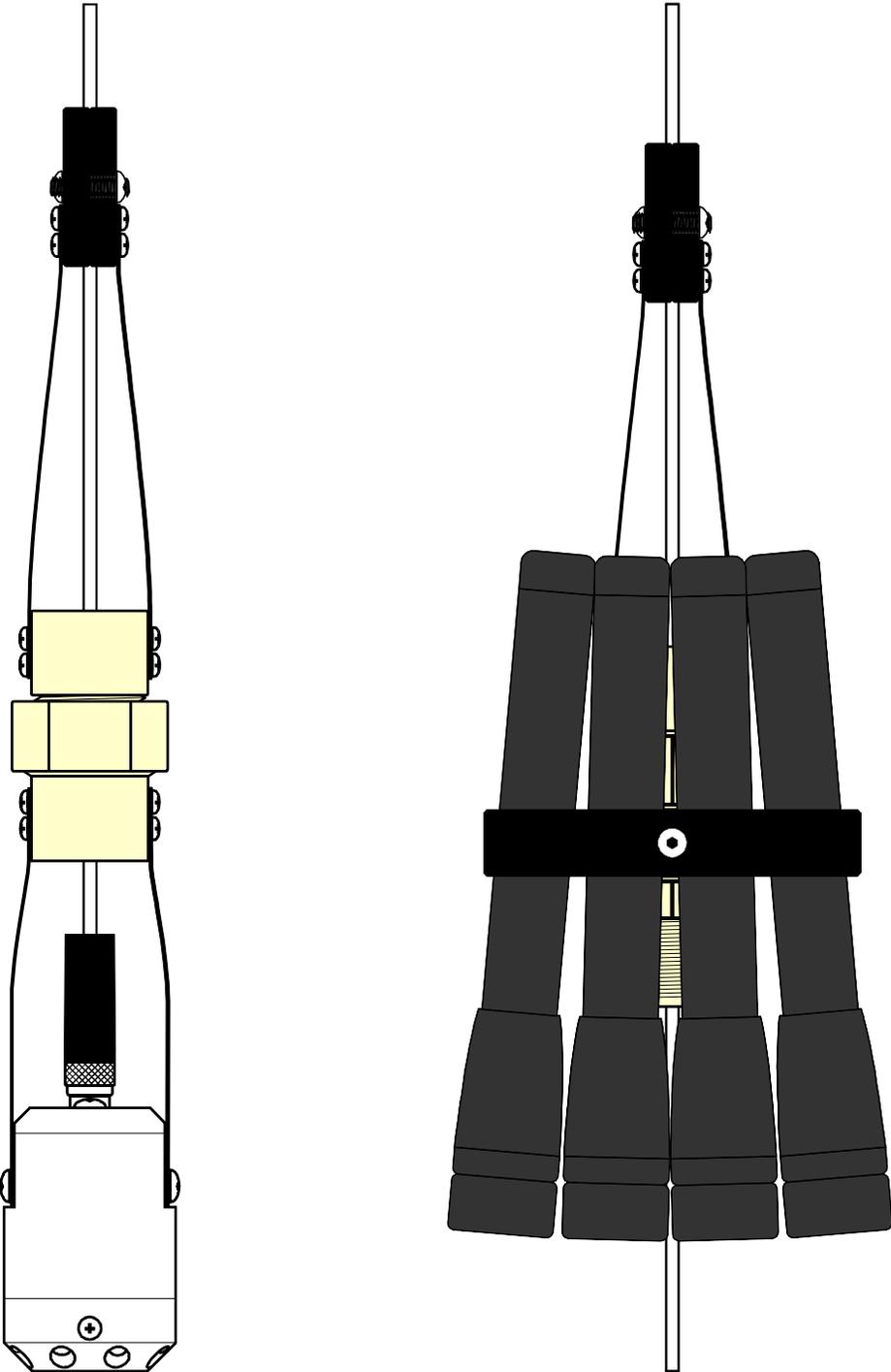


Cable Support Clamp Exploded View



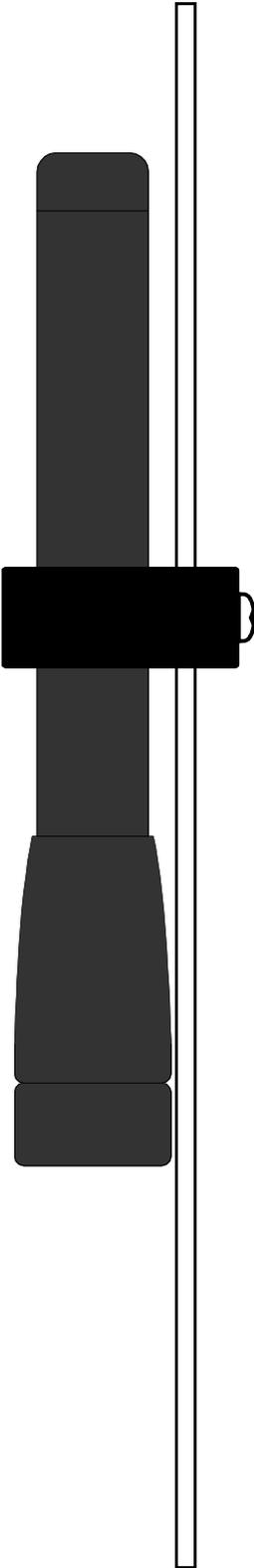
- 1) MP-0152 #8-32 x 5/8 Stainless Steel Screw
- 2) MP-0145 #4-40 x 3/16 Stainless Steel Screw
- 3) MP-0153 #4-40 x 1/4 Stainless Steel Screw
- 4) GVJR-0014 Stainless Steel Strap
- 5) GVJR-1001 Acetal Splice Clamp
- 6) GVJR-1196 3/4" Male CPVC Adapter

The Cable Support Clamp is used primarily to support a camera without a centralizer or auxiliary lighting as illustrated here.

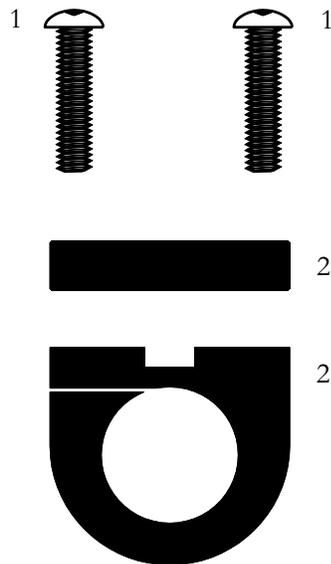


Appendix L

Auxiliary Single Light



Auxiliary Single Light Holder Exploded View



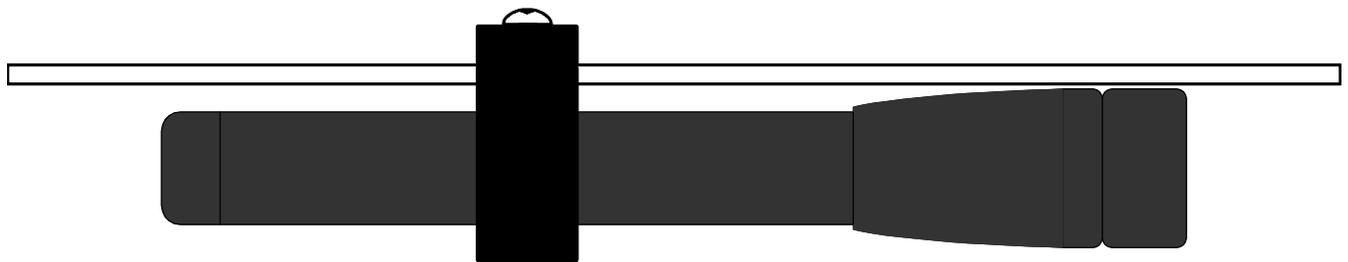
- 1) MP-1719 #8-32 x 3/4 Stainless Steel Screw
- 2) GVJR-1290 Single Light Holder

The Auxiliary Single Light is composed of one light and a Single light holder.

To attach the Auxiliary Single Light, remove the two screws and separate the two halves of the holder. Place the cable in the slot in the holder's bottom half, place the upper half of the holder over the cable, replace the screws but do not tighten them. Slide the light into the holder pointing towards the camera.



Slide the light and holder to the desired location on the cable and tighten the screws to clamp everything together.



To turn on the light, rotate the flared reflector end of the light clockwise. To turn off the light, rotate the reflector in the opposite direction.

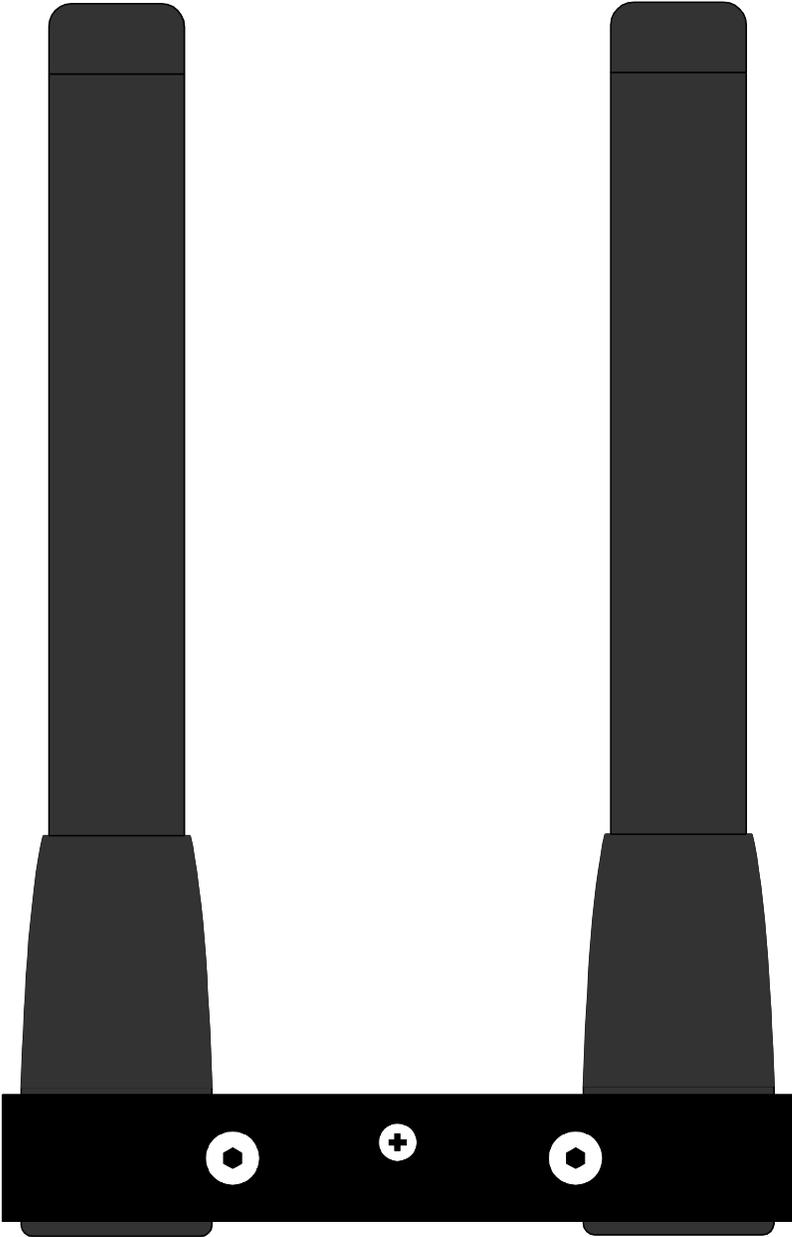
The first time the light is turned on, it is in full intensity mode. If it is turned off and then back on within a few seconds, it is in low intensity mode. If it is then turned off and back on within a few seconds it is in flashing mode. Turning it off and then back on within a few seconds returns the light to full intensity mode.

A fresh set of alkaline batteries will last for more than four hours. Always use new alkaline batteries.

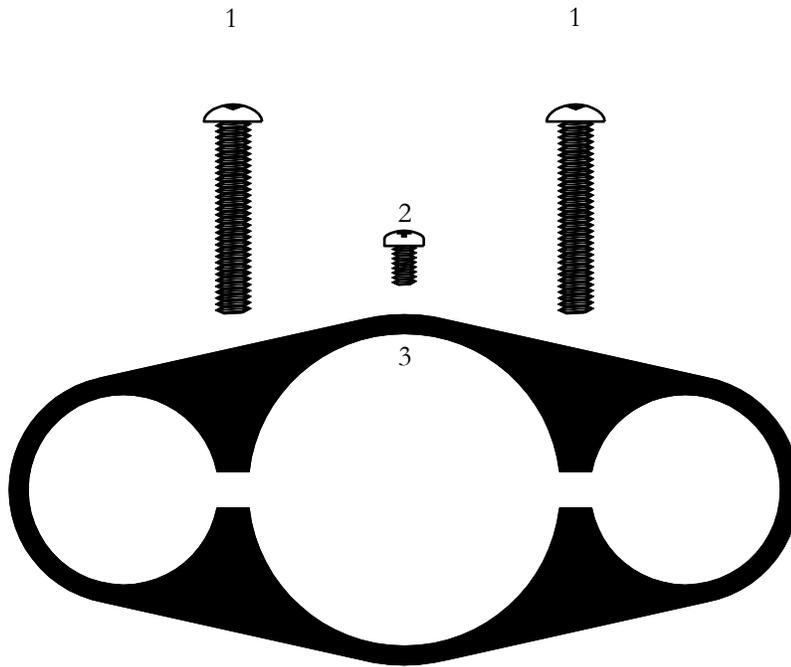
To replace the batteries, unscrew the rear endcap (the small end) of the light.

Appendix M

Auxiliary Double Light



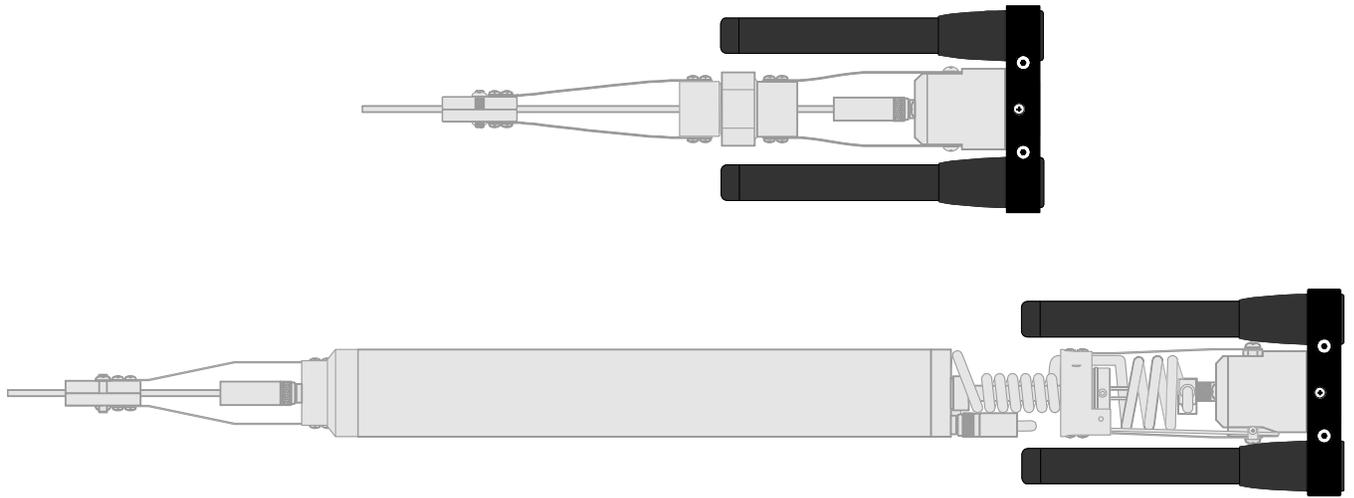
Auxiliary Double Light Holder Exploded View



- 1) MP-1720 #8-32 x 1 Stainless Steel Screw
- 2) MP-0145 #4-40 x 3/16 Stainless Steel Screw
- 3) GVJR-1315 #4-40 x 1/4 Double Light Holder

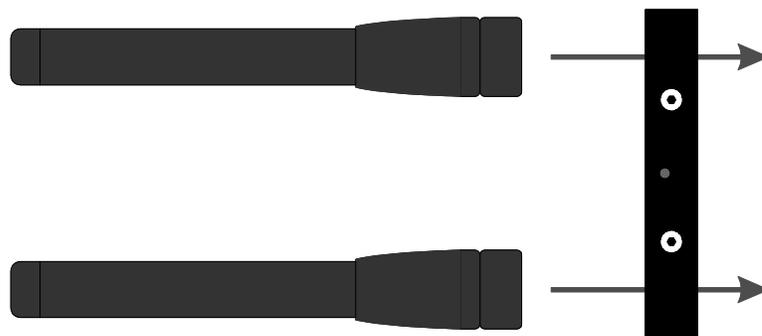
Overview

The Auxilliary Double Light can be used with either a Standard Stainless Steel or Standard Plastic camera. The light holder mounts directly to the camera and can be used with a fixed camera mount or with a Pan-Tilt Control.

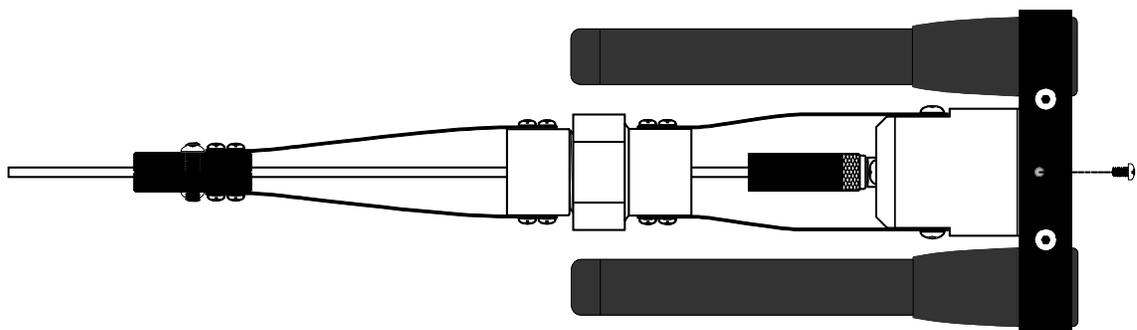


Configuration

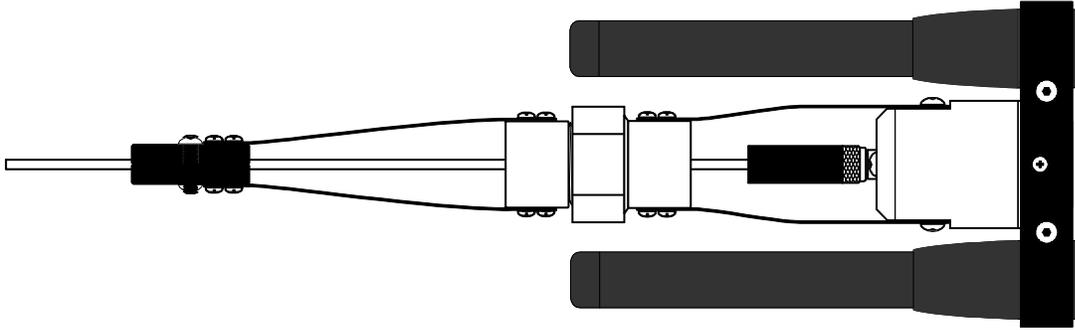
The same procedure is used to mount the Auxiliary Double light to either a Standard Stainless Steel or Standard Plastic camera. First lightly clamp the two lights in the Double Light Holder using the two long screws. Note that the small hole in the center of the holder used to attach the holder to the camera is offset to one side. The lights point toward the opposite side.



Remove the 3/16" Attachment screw from the front of the camera. Slide the holder and lights over the front of the camera.

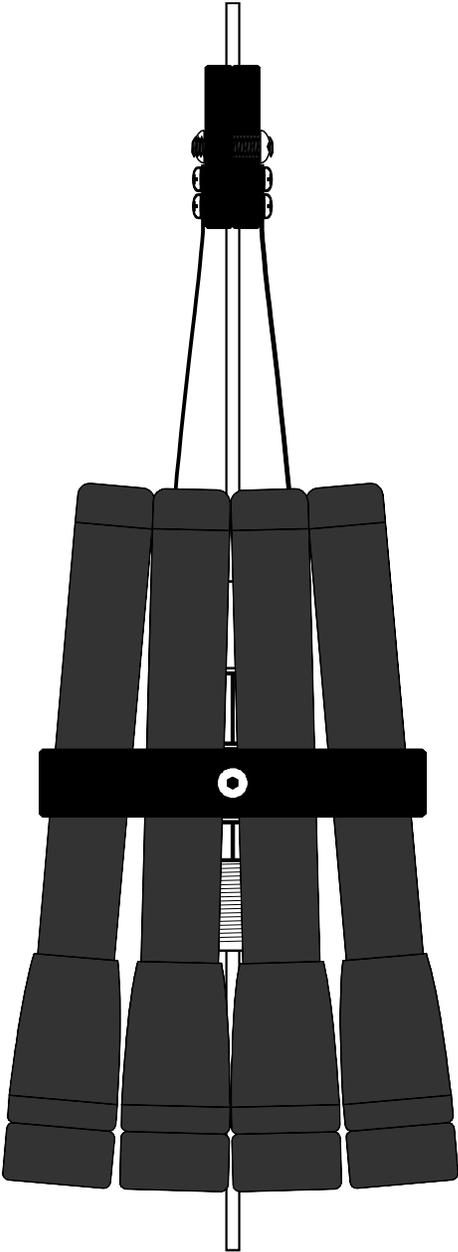


Secure the lights to the camera by reinserting and tightening the Attachment screw and tighten the two long screws to firmly clamp them in the holder..

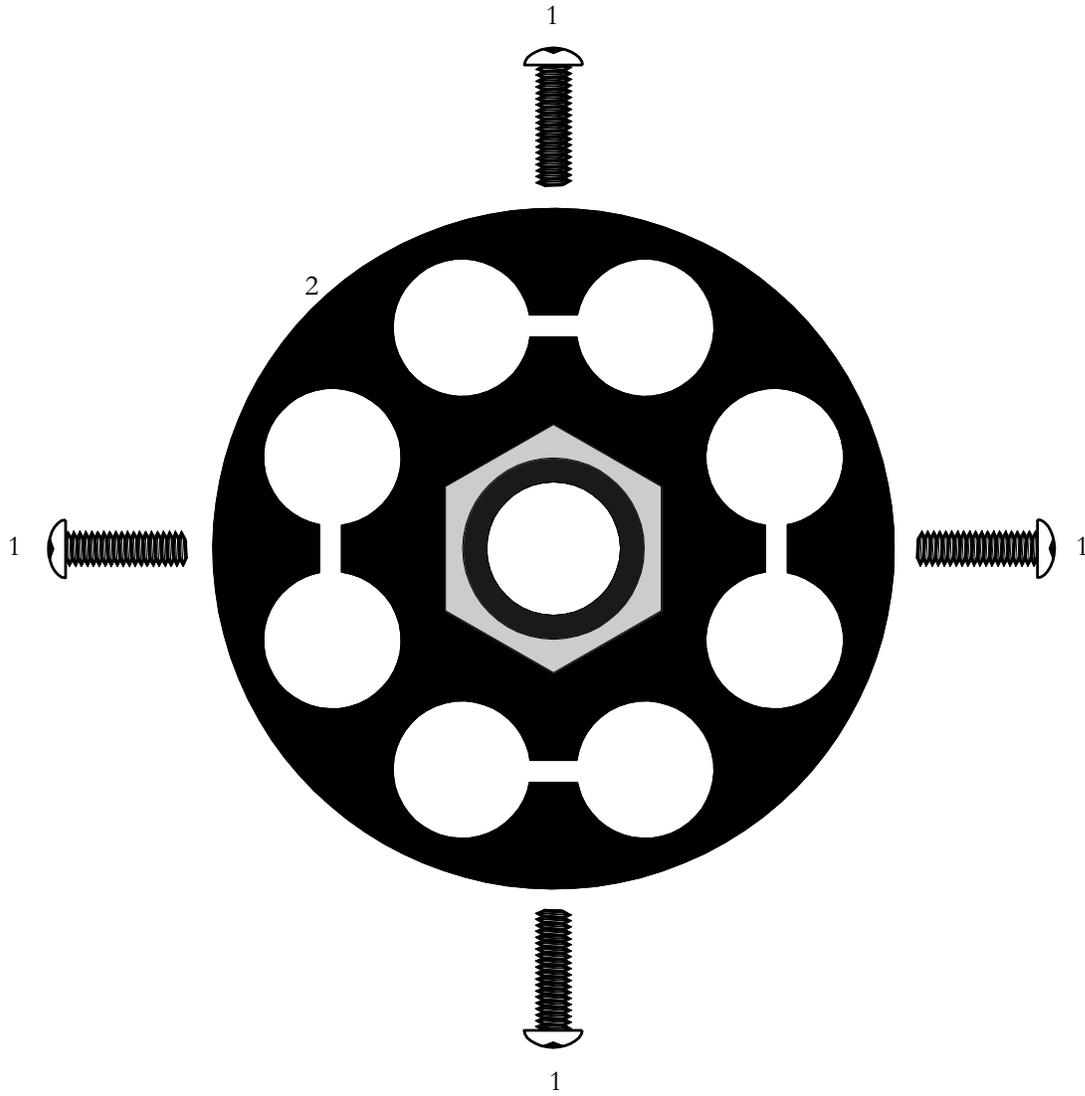


Appendix N

Auxiliary Fixed Eight Light



Auxiliary Fixed Eight Light Holder Exploded View



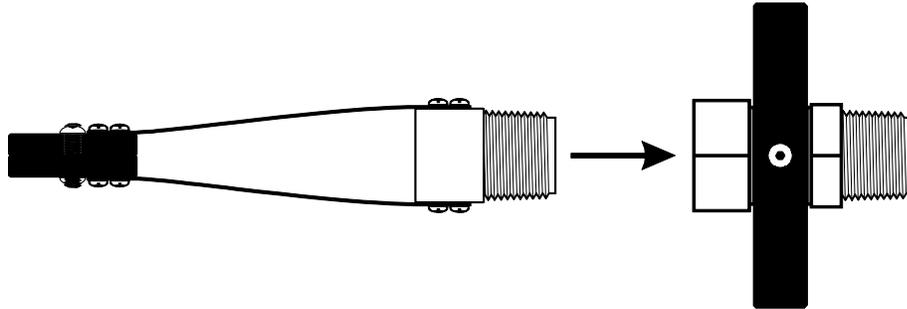
- 1) MP-0152 #8-32 x 5/8 Stainless Steel Screw
- 2) GVJR-1210 Fixed Eight Light Holder

Overview

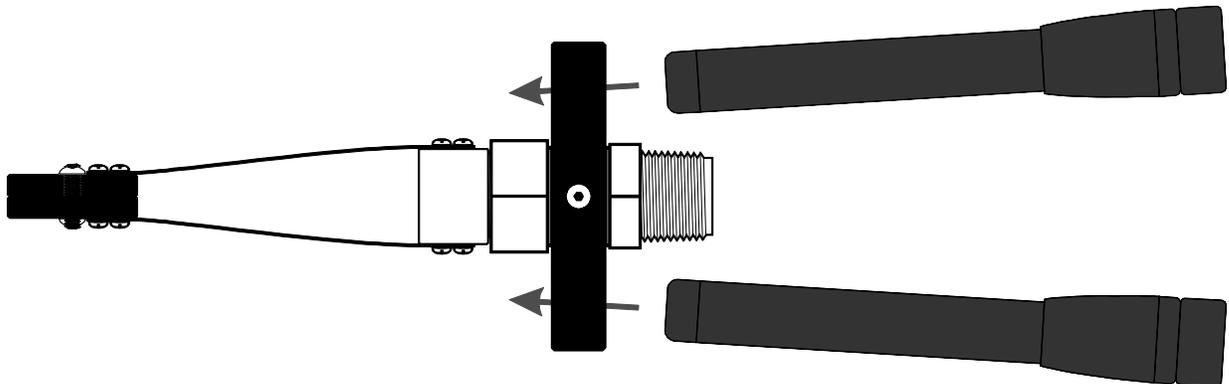
The Auxiliary Fixed Eight Light is designed for use in very large bores or in bores with very dark walls. The light clamps onto the winch cable and can be positioned anywhere above the camera. The larger the bore, the farther the lights should be placed from the camera.

Configuration

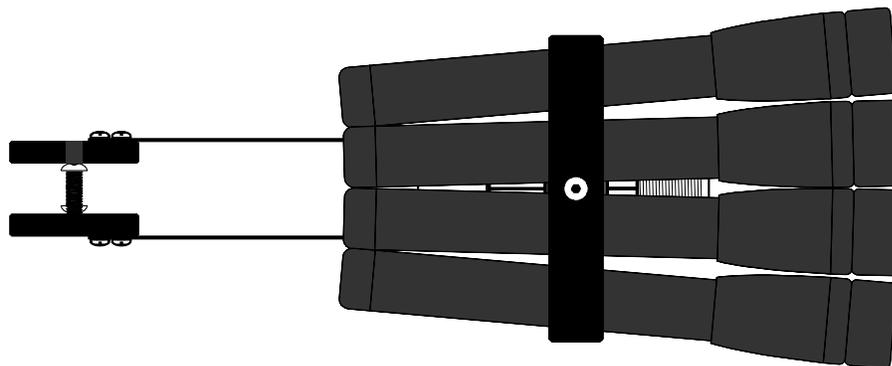
Screw the Cable Support Clamp or the Centralizer to the holder.



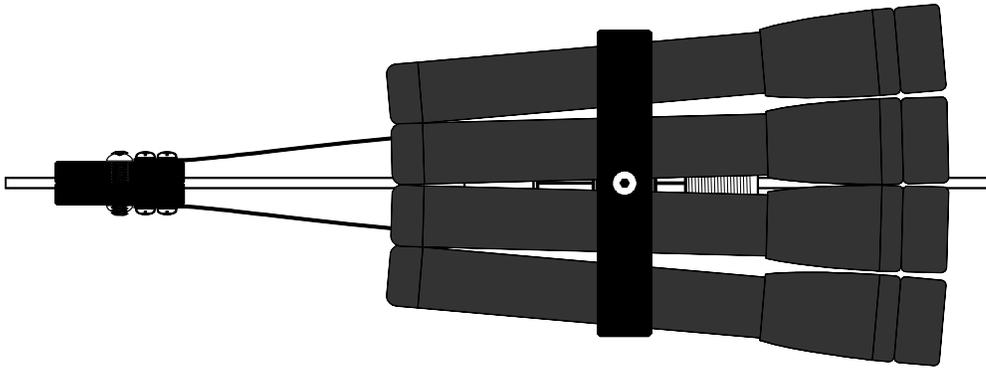
Install the lights in the holder and clamp them in place with the four screws.



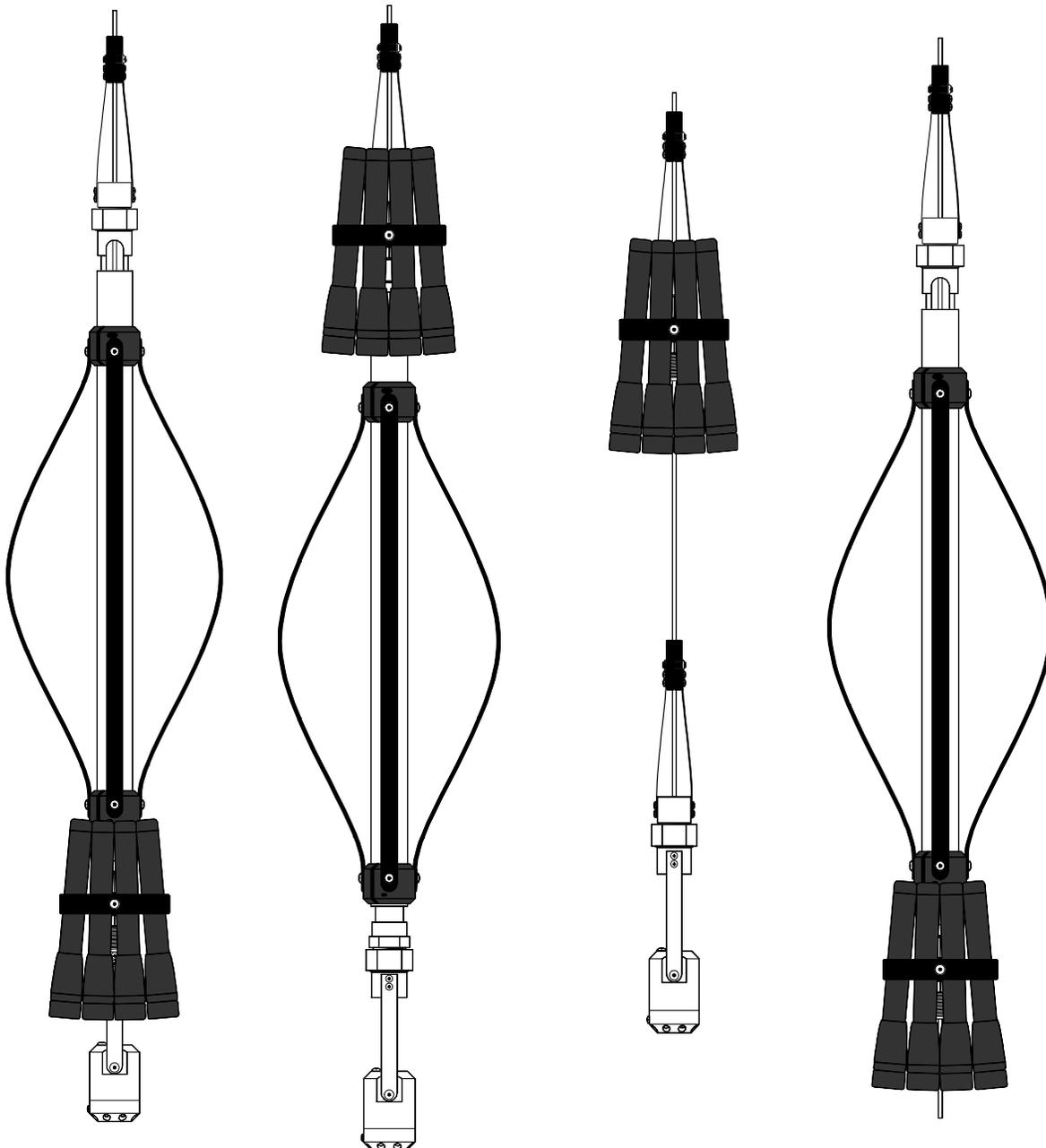
Loosen the two large screws in the Cable Support Clamp, slide the two halves of the clamp sideways and open the clamp.



Pass the winch cable through the clamp and the holder and clamp the assembly to the cable.

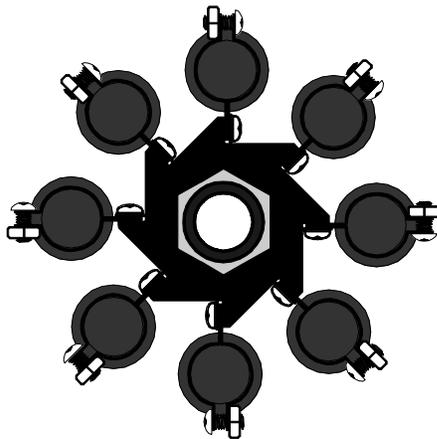
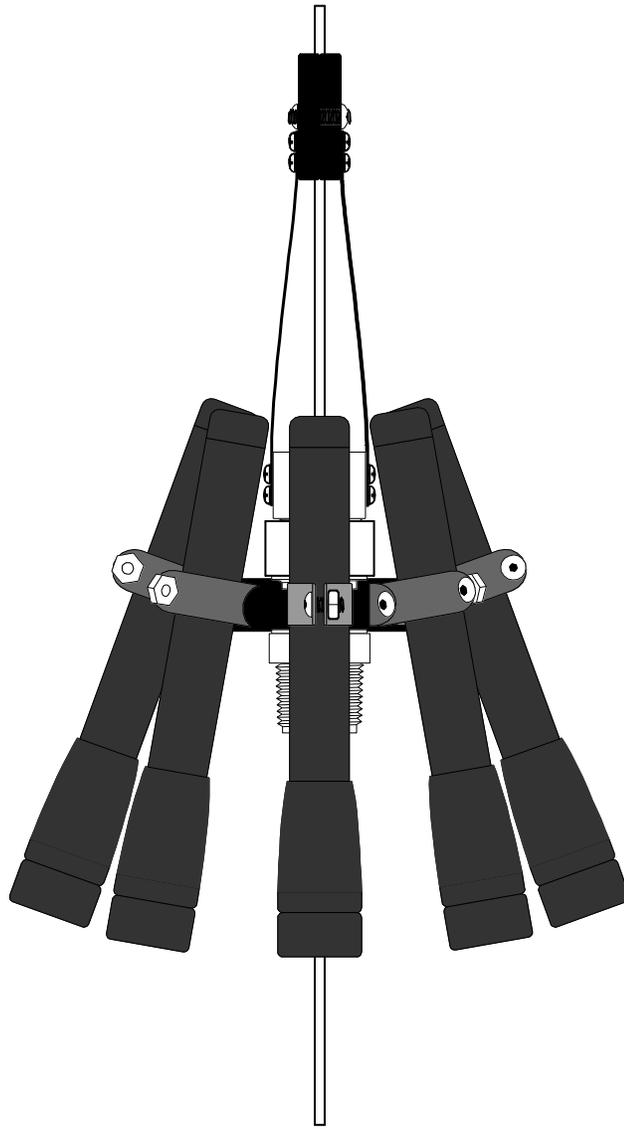


The Auxiliary Fixed Eight Lights can be used in many configurations, a few are shown below.

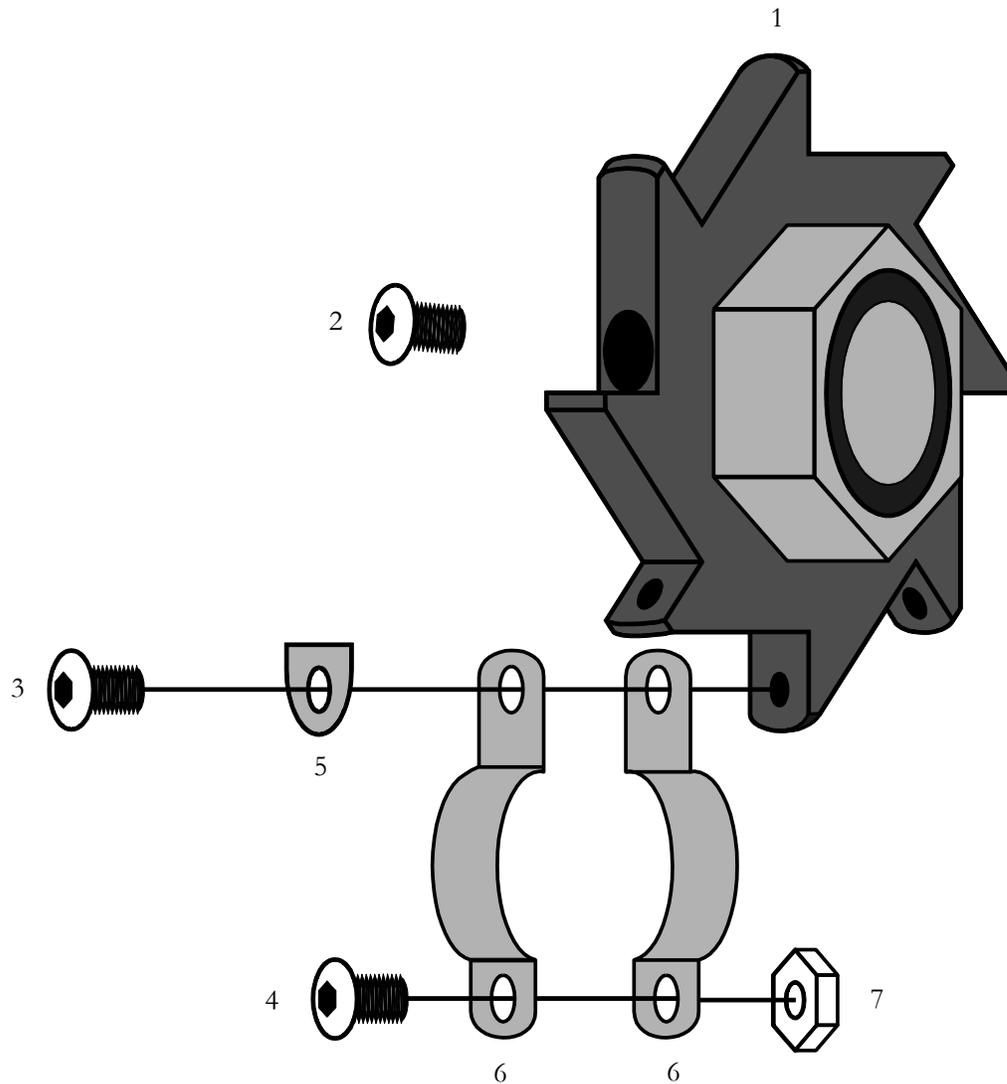


Appendix O

Auxiliary Adjustable Eight Light



Auxiliary Fixed Eight Light Holder Exploded View



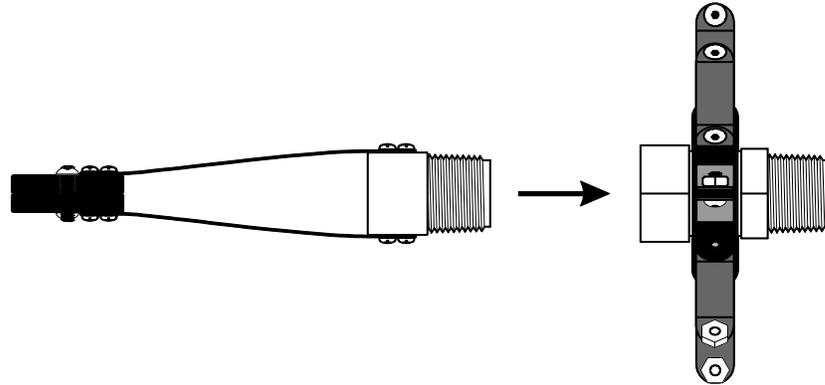
- 1) GVJR-1329 c
- 2) MP-0189 #8-32 x 3/8 SS Rotation Locking Screw
- 3) MP-0189 #8-32 x 3/8 SS Pivot Adjustment Screw
- 4) MP-0189 #8-32 x 3/8 SS Light Clamping Screw
- 5) GVJR-1221 Adjustable 8-Light Clamp Washer
- 6) GVJR-1217 Adjustable 8-Light Clamping Strap
- 7) MP-0017 #8-32 Stainless Steel Nut

Overview

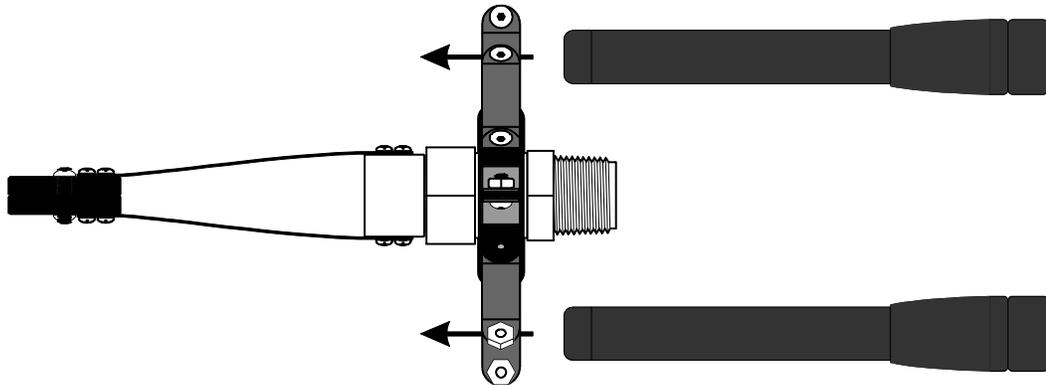
The Auxiliary Adjustable Eight Light is designed for use in very large bores or in bores with very dark walls. The light clamps onto the winch cable and can be positioned anywhere above the camera and adjusted to point anywhere from straight down to nearly straight out. This light also has the ability to rotate freely or it can be locked in place by tightening the Rotation Locking Screw (#2) near the center of the holder.

Configuration

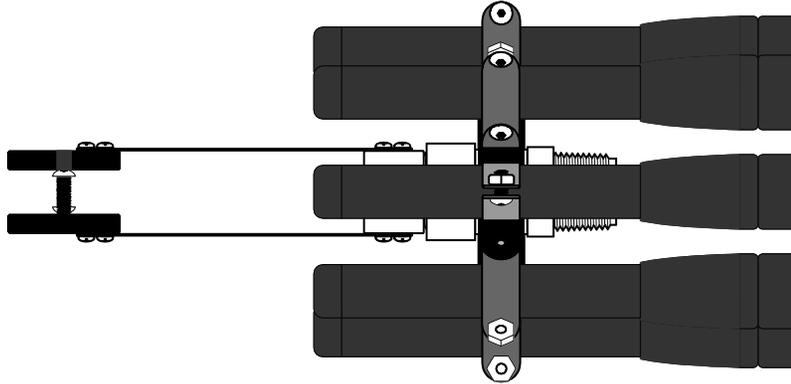
Screw the Auxiliary Adjustable Eight Light Holder to either a Cable Support Clamp or a Centralizer.



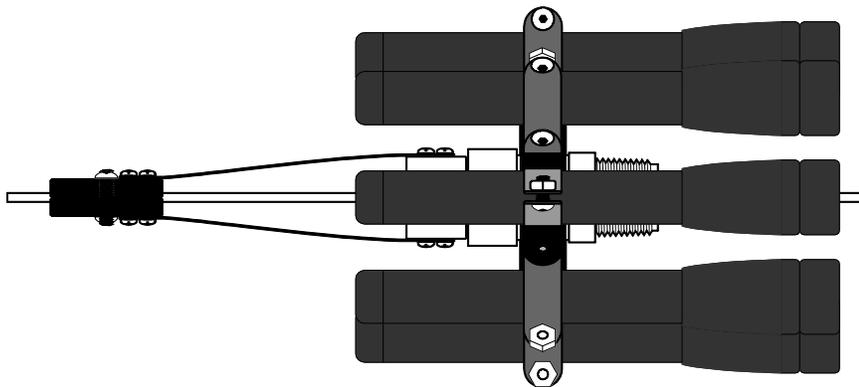
Install one or more the lights in the holder by loosening the Light Clamping Screw (#4) and nut that hold the Clamping Straps (#6) together, sliding the lights between the straps and tightening the screw. If the light pivots too freely, tighten the Pivot Adjustment Screw (#3) that joins the straps to the Adjustable 8-Light Inner Assembly (#1).



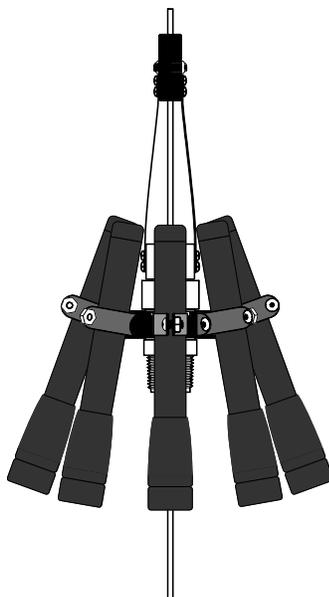
Loosen the two large screws in the Cable Support Clamp, slide the two halves of the clamp sideways and open the clamp.



Pass the winch cable through the clamp and holder assembly, slide the two halves of the clamp together over the cable and tighten the screws to clamp the lights to the cable.



The lights can now be adjusted to point straight down or out to the side. To point the lights away from center, it may be necessary to slide the lights in the Clamping Straps so that just the end of the light is in the straps.

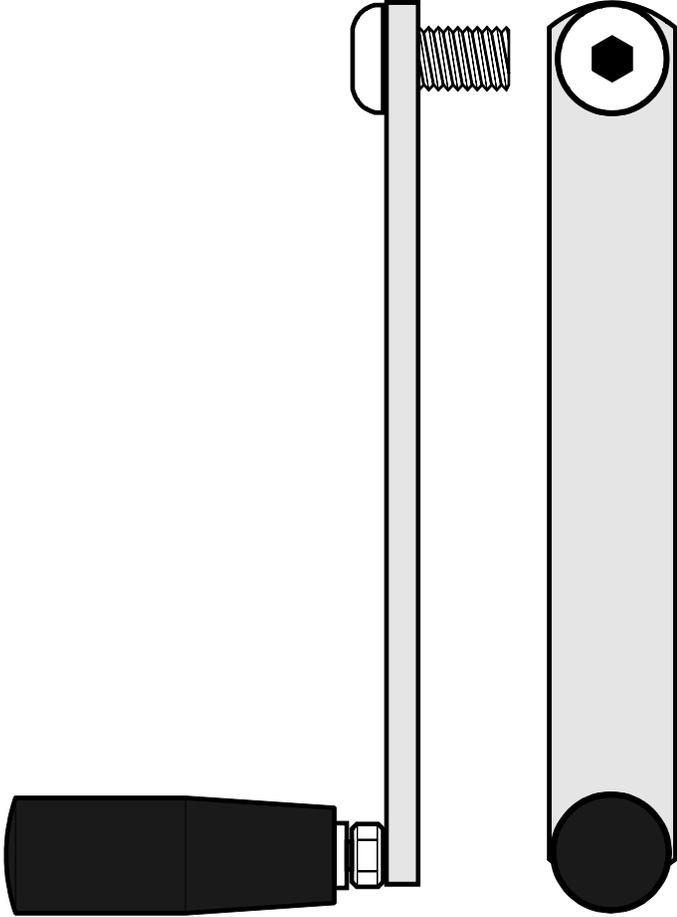


The Auxiliary Adjustable Eight Lights can be used in many configurations, a few are shown below.

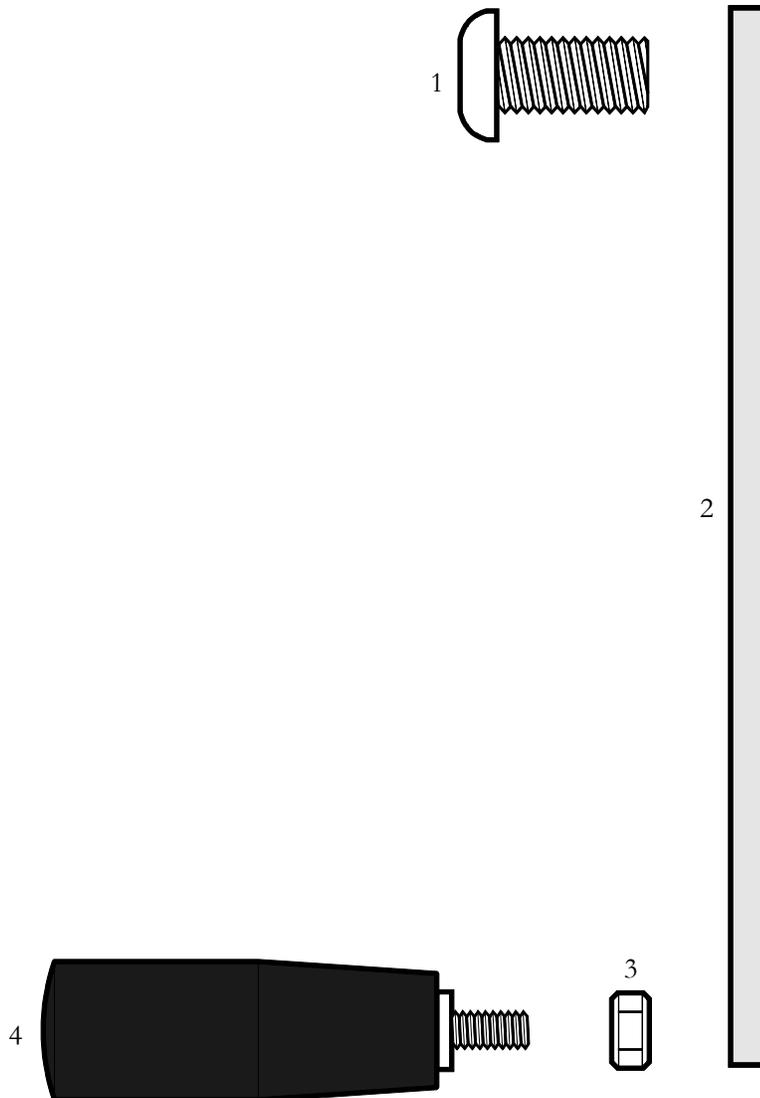


Appendix P

Emergency Crank Handle



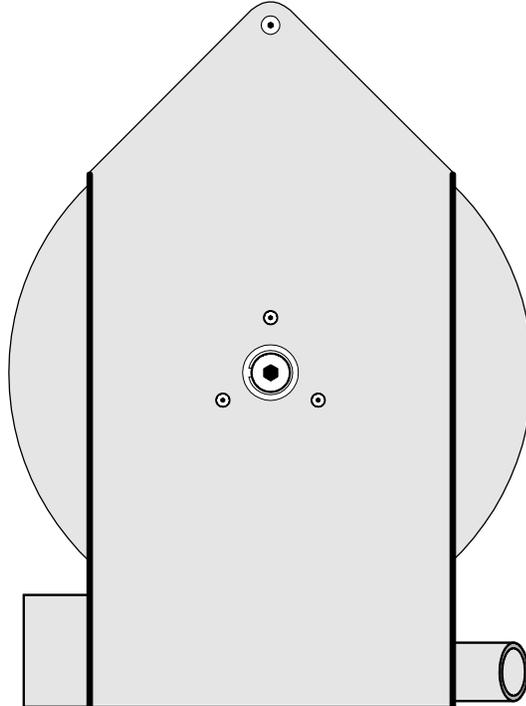
Emergency Crank Handle Exploded View



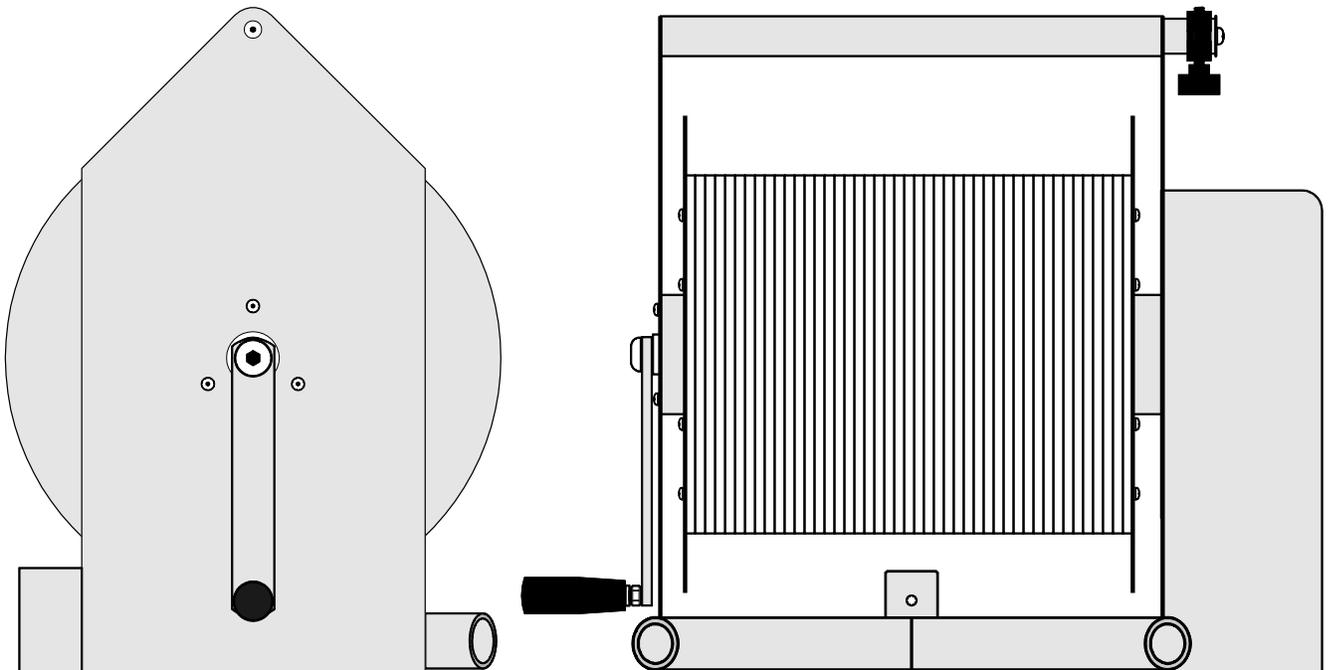
- 1) MP-1442 1/2-13 x 1" Stainless Steel Button Head Cap Screw
- 2) GVJR-0994 Aluminum Deluxe Crank Shaft
- 3) MP-1581 1/4-20 Stainless Steel Nut
- 4) MP-1243 Deluxe Crank Handle

The Emergency Crank Handle is designed for use in the event of winch motor failure. The following procedure describes the installation and use of the Emergency Crank Handle.

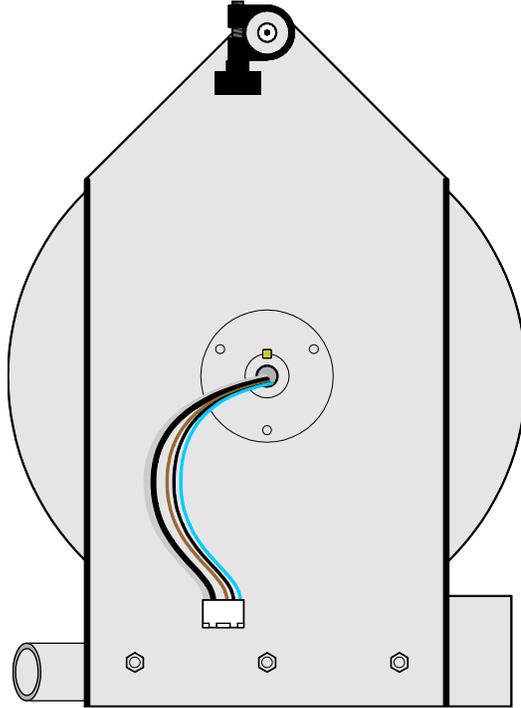
1. Remove the 1/2 by 1 inch bolt from the center of the winch shaft. It is located on the opposite side of the winch from the Control Panel.



2. Install the Emergency Crank Handle in the winch shaft where the 1/2 by 1 inch bolt was removed.

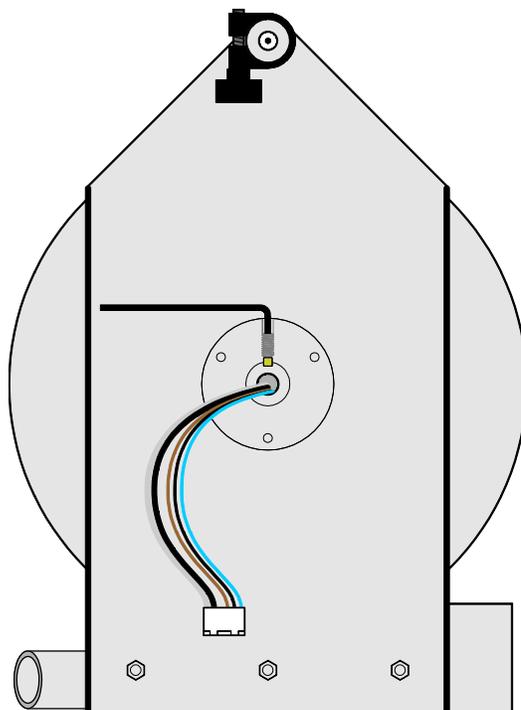


3. While holding onto the Emergency Crank Handle, turn off the Control Panel and unplug the winch.
4. Remove the 8 screws that hold the Control Panel to the winch and unplug the Control Panel from the winch.

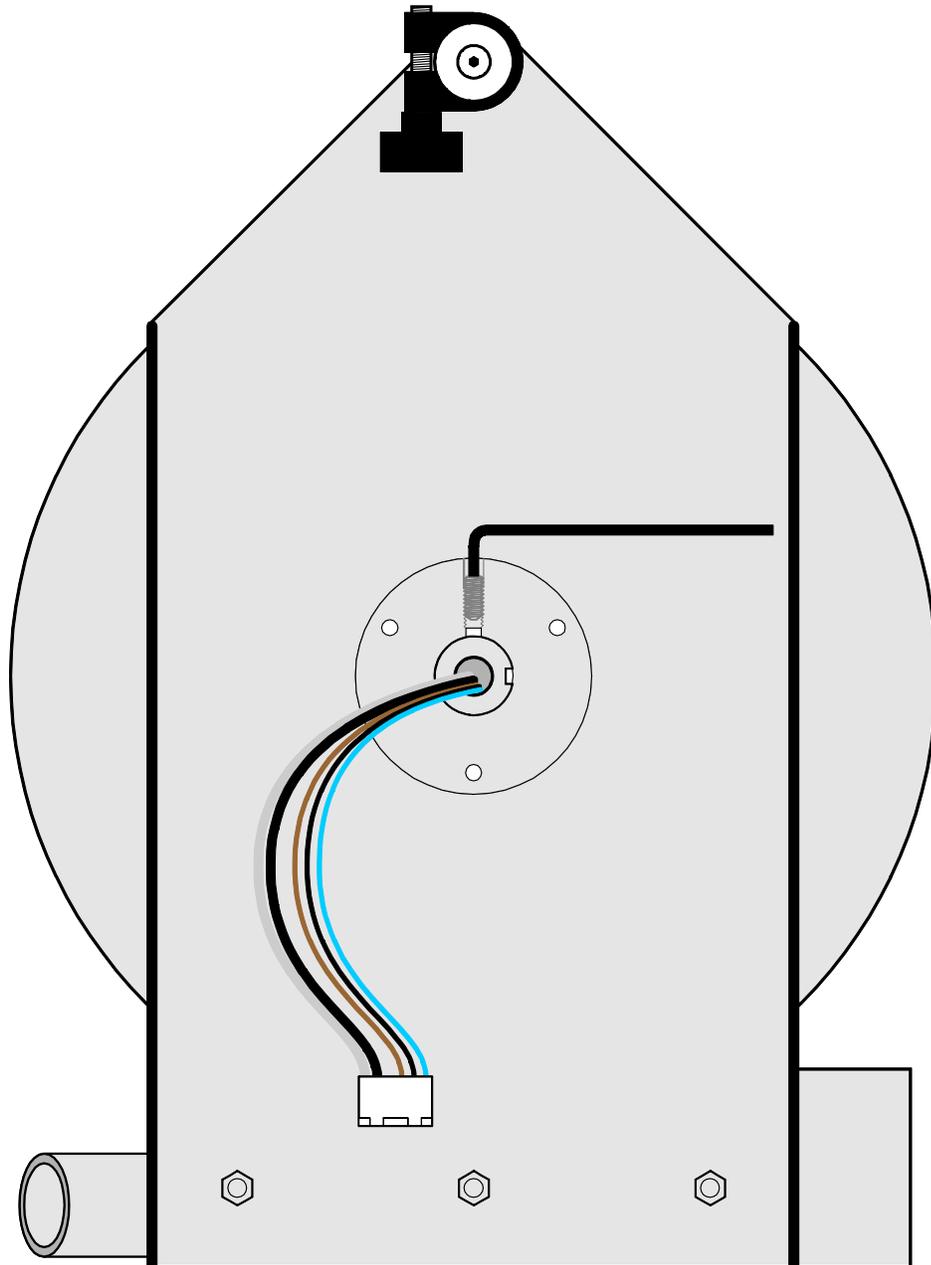


WARNING: Before proceeding, it is critical that you or an assistant firmly hold the Emergency Crank Handle for the rest of this procedure. If the handle is allowed to spin freely, serious damage and possibly injury could result.

5. Use a 1/ 8" hex key to loosen the set screw that holds the brass key in the winch shaft.



6. Grasp the end of the brass key and gently pull it out. If the key does not come out easily, use the Emergency Crank Handle to gently rotate the shaft clockwise and then counter-clockwise until the key can be removed. With the key removed, the shaft and wires will spin freely.



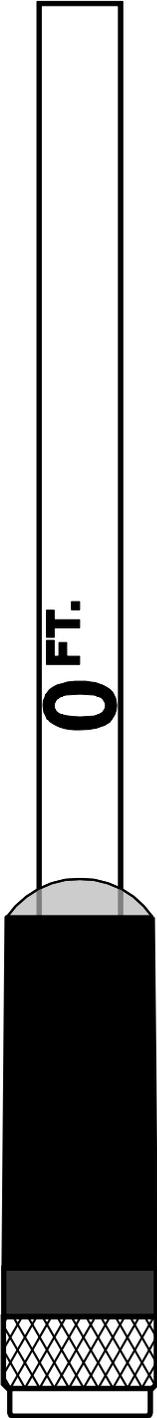
7. The Emergency Crank handle can now be used to retrieve the camera from the bore. Never connect the Control Panel to the winch when using the Emergency Crank Handle. Doing so will cause serious damage to the winch.

If the Emergency Crank Handle appears to bind when turning, a small amount of oil can be applied to the key slot to lubricate the shaft.

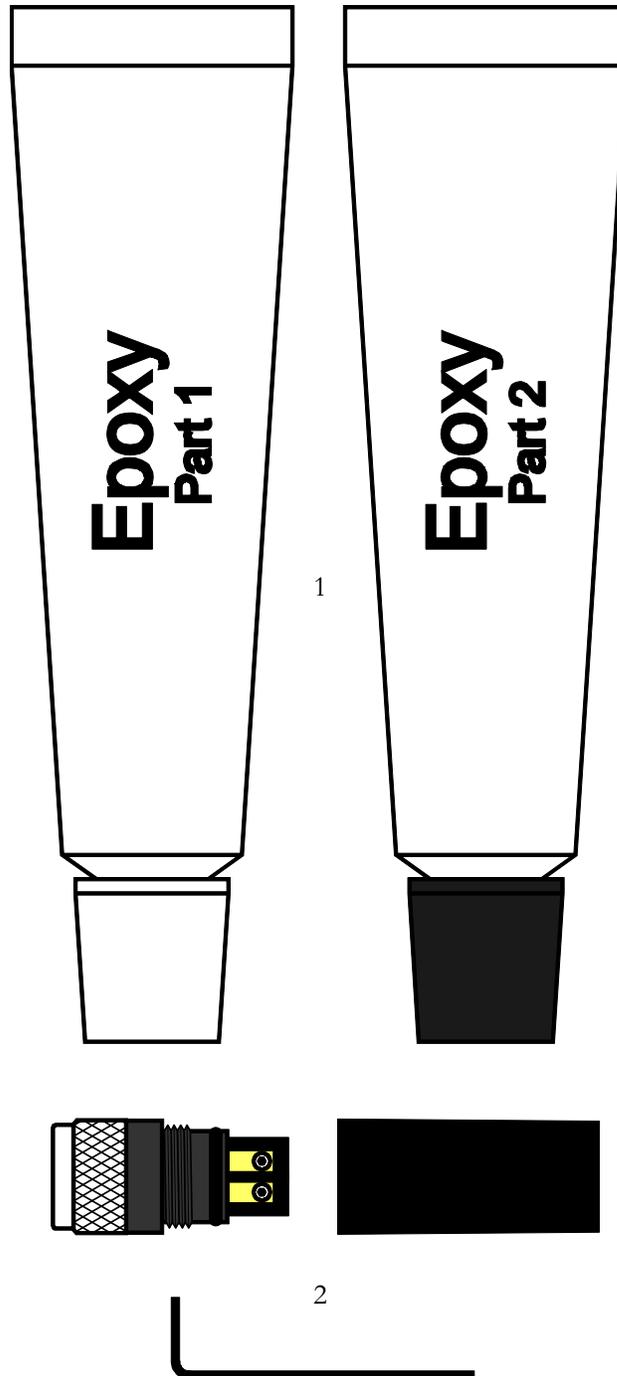
Before shipping the winch back for repair, reinstall the brass key and remove the Emergency Crank Handle by performing steps 1 through 6 in reverse order

Appendix Q

Cable End Replacement Kit



Cable End Replacement Kit Contents

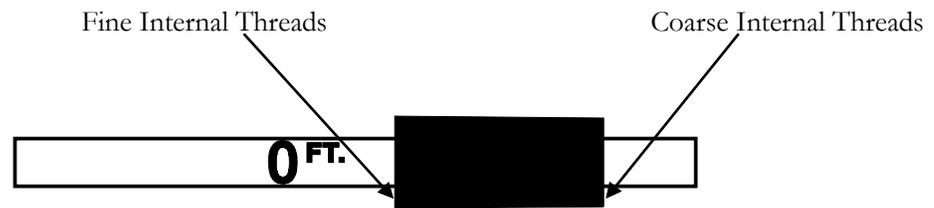


- 5) MP-1462 Two 0.5 oz Tubes of 2 Ton Epoxy
- 6) GVJR-0968 Cable End Connector with Hex Key

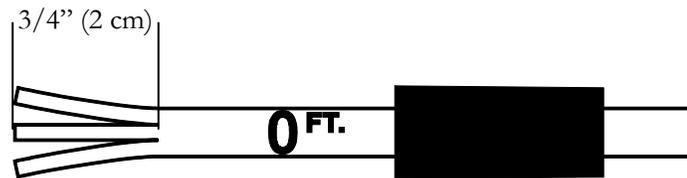
The Cable End Replacement Kit contains the parts necessary to replace the connector on the end of the winch cable. While the connector can be replaced using only this kit, it is highly recommended that the cable be soldered to the connector before the connector is filled with epoxy.

Follow the steps below to replace the Cable End Connector.

1. Cut away the damaged section of cable and check that the remaining cable is in good condition. If you remove more than 10% of the winch cable, you will need to reset the output voltages on the Control Panel once the connector has been replaced. If you are not familiar with resetting Control Panel voltages, contact Allegheny Instruments.
2. Slide the Connector Shield over the winch cable. Be sure that the correct end is facing the end of the cable. The end of the shield that screws onto the new connector has fine internal threads.



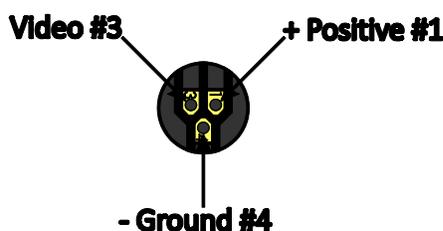
3. Make a cut 3/4" (2 cm) deep between each conductor.



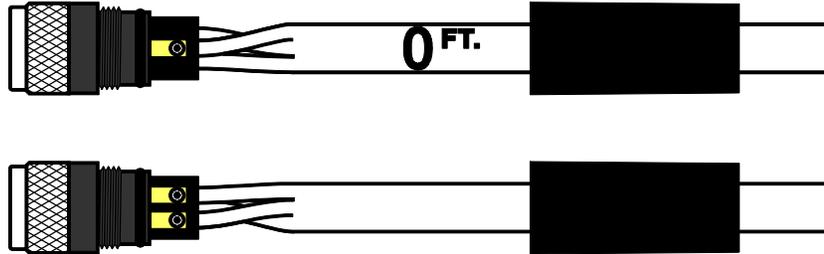
4. Strip 1/4" (1 cm) of insulation from each conductor and tin each with solder. The surface of each conductor must be clean and copper colored. If a conductor appears black, use fine steel wool to remove the oxidation. Note that the outer two conductors are copper coated steel. If the thin copper coating is removed from the steel during cleaning, solder will not bond to the steel and this part of the cable must be cut away and steps 2-4 repeated.



5. Note which conductor goes in each of the holes in the connector and then bend the conductors so that they align with the holes. Carefully refer to the images below.



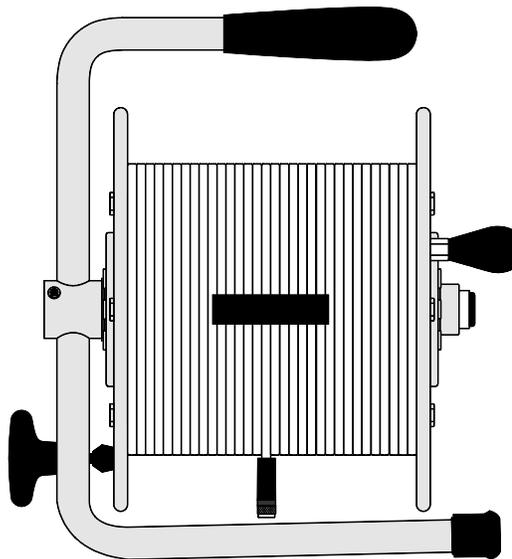
- Insert the cable into the connector and tighten the set screws to lock the conductors in place. Be very careful not to lose the tiny set screws because there are no extras. Use the following images as a reference.



- Slide the Shield down to the connector and screw the two together. If they do not thread together, the shield was installed backwards in step 2.



- Connect the camera to the connector and verify proper operation. If there is a problem, redo steps 5-7 until the system works properly.
- Unscrew the shield from the connector and solder each conductor to its gold lug. This step can be skipped, however doing so will substantially reduce the lifespan of the new connector.
- Reconnect the shield to the connector and clamp the connector upright so that epoxy can be inserted between the shield and the cable. Tape is used in the image below.



- Mix together approximately 1/2 of the epoxy from the two tubes. Stir the mixture for about one minute. Using a small stick, slowly drip the mixed epoxy along one side of the cable so that it flows along the cable and into the connector. If done slowly, the epoxy will flow into the connector and completely fill the void without trapping any bubbles inside.
- Let the epoxy harden for at least 12 hours before use.

Limited Warranty

Allegheny Instruments (hereafter referred to as Allegheny Instruments) warrants the original owner of a GeoVISION™ Deluxe Borehole Video System purchased with a Standard Stainless Steel camera, a Nano camera or a Dual-Scan camera to be free from defects in the workmanship of all parts of the Camera, the Control Panel and the Winch, manufactured by Allegheny Instruments, for a period of 2 years from the date of purchase.

Allegheny Instruments warrants the original owner of a GeoVISION™ Heavy-Duty Borehole Video System or a GeoVISION™ Deluxe Borehole Video System purchased with a Standard Plastic camera to be free from defects in the workmanship of all parts of the Camera, the Control Panel and the Cable Reel, manufactured by Allegheny Instruments, for a period of 1 year from the date of purchase.

Allegheny Instruments reserves the right to repair or replace any defective part(s), to replace a part with a comparable model, or to refund the purchase price. This warranty covers the cost of the part(s) and labor to replace such parts for the repair of the workmanship defect. Warranty service must only be performed at the Allegheny Instruments factory.

This warranty does not warrant uninterrupted or error-free operation of a system or any components of the system.

This Warranty Does Not Cover:

- Labor for installation, set-up or adjustment of customer controls.
- Product repair and/or replacement due to misuse, accident, unauthorized repair or other causes not within the control of Allegheny Instruments.
- Premature failure of components resulting from not keeping them clean and dry when stored.
- Picture problems caused by interference from outside sources.
- Reel/Winch cable.
- Incidental or consequential damages resulting from the product or use of the product.
- Shipping costs to or from the Allegheny Instruments factory.

To Obtain Warranty Service

Before returning any component you must contact Allegheny Instruments for an RMA number. Failure to obtain an RMA number could result in the return of all parts without repair. To obtain an RMA number, contact Allegheny Instruments in one of the following ways.

Telephone Inside the USA or Canada:

800-343-3479

Telephone Outside the USA or Canada:

540-396-4740

Email:

Repair@AlleghenyInstruments.com

Post:

Allegheny Instruments, Inc.
Attn: Repairs
1243 Burnsville Road
Williamsville, VA 24487 USA

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