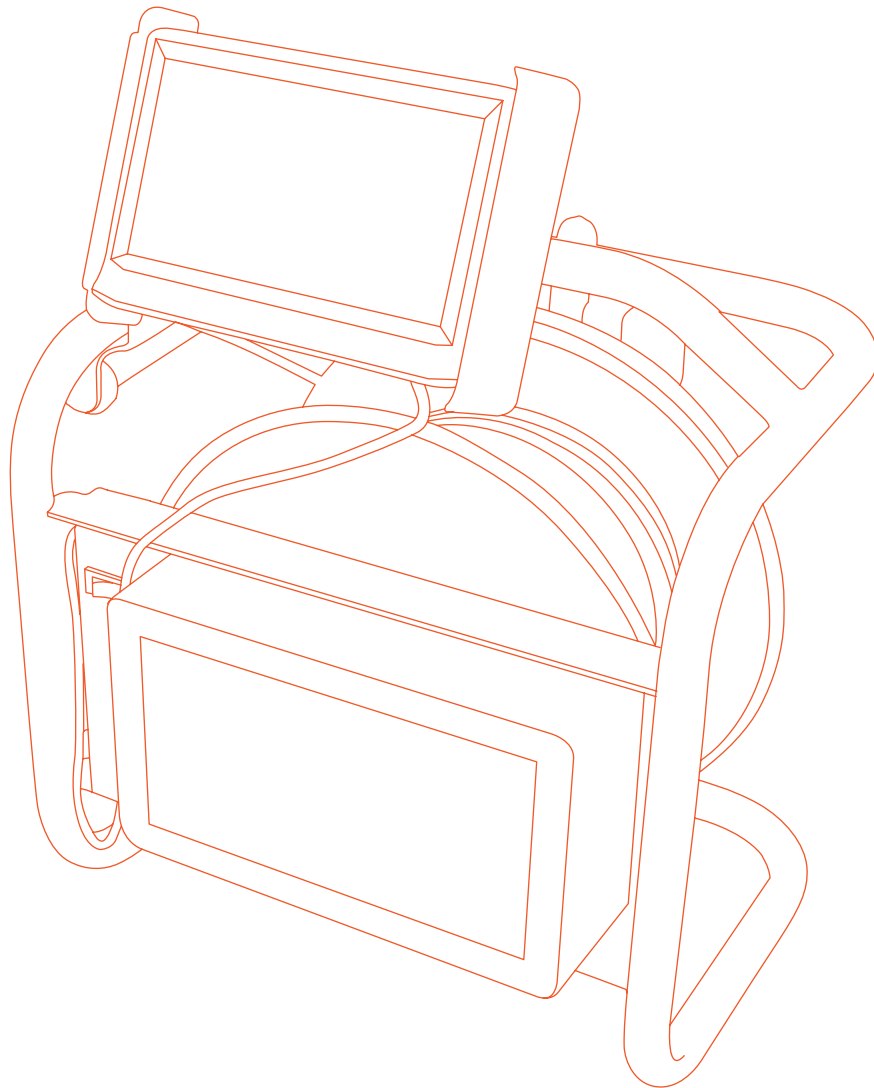




STRATACAM™
MINI BOREHOLE CAMERA

Operations Manual

Edition 1.0



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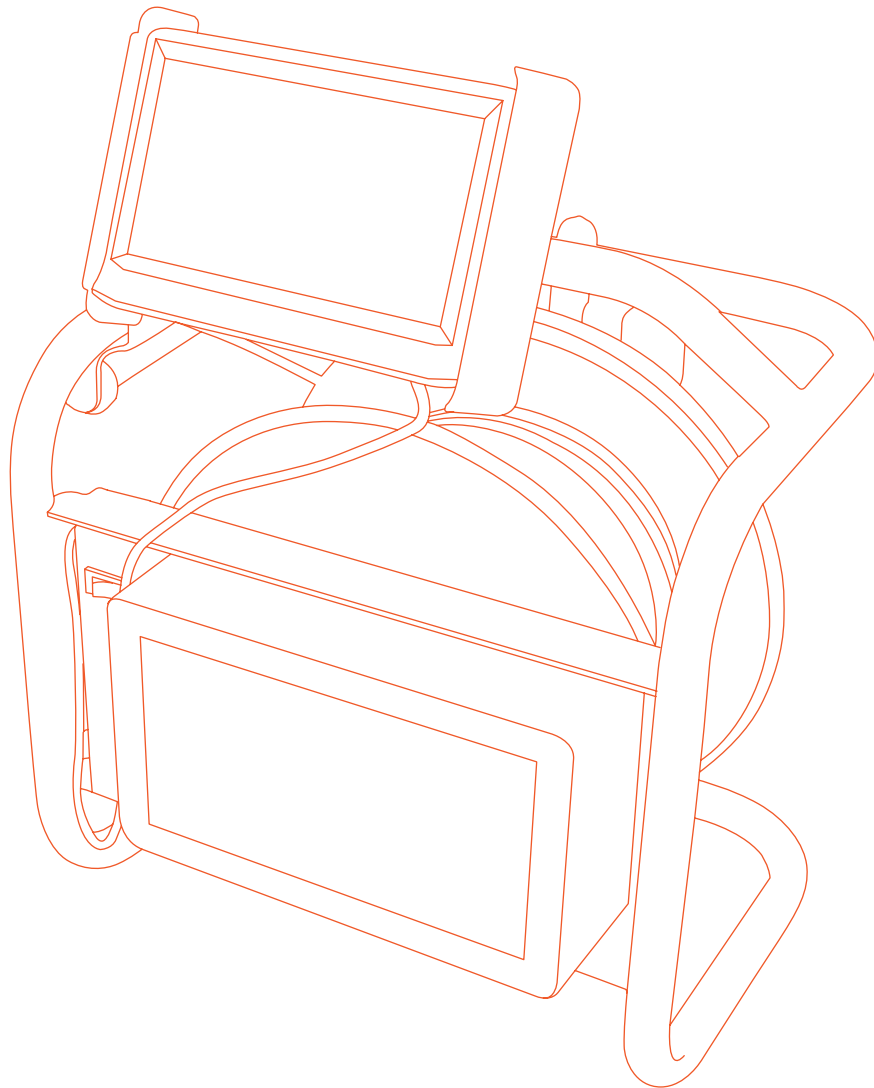
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Chapter 1

Introduction



Overview

This section gives an overview of the **StrataCam™ Mini Borehole Camera**, a list of all the components included and overviews of the **StrataCam™ Mini Camerahead** and the **StrataCam™ Mini Cable Unit**.

1.1 Congratulations On Your Purchase

Congratulations on your purchase of a **StrataCam™ Mini Borehole Camera** system. This Operations Manual provides instructions on the use of the camera and the hardware supplied with it.

1.2 Ensuring That All StrataCam™ Mini Hardware Has Been Received

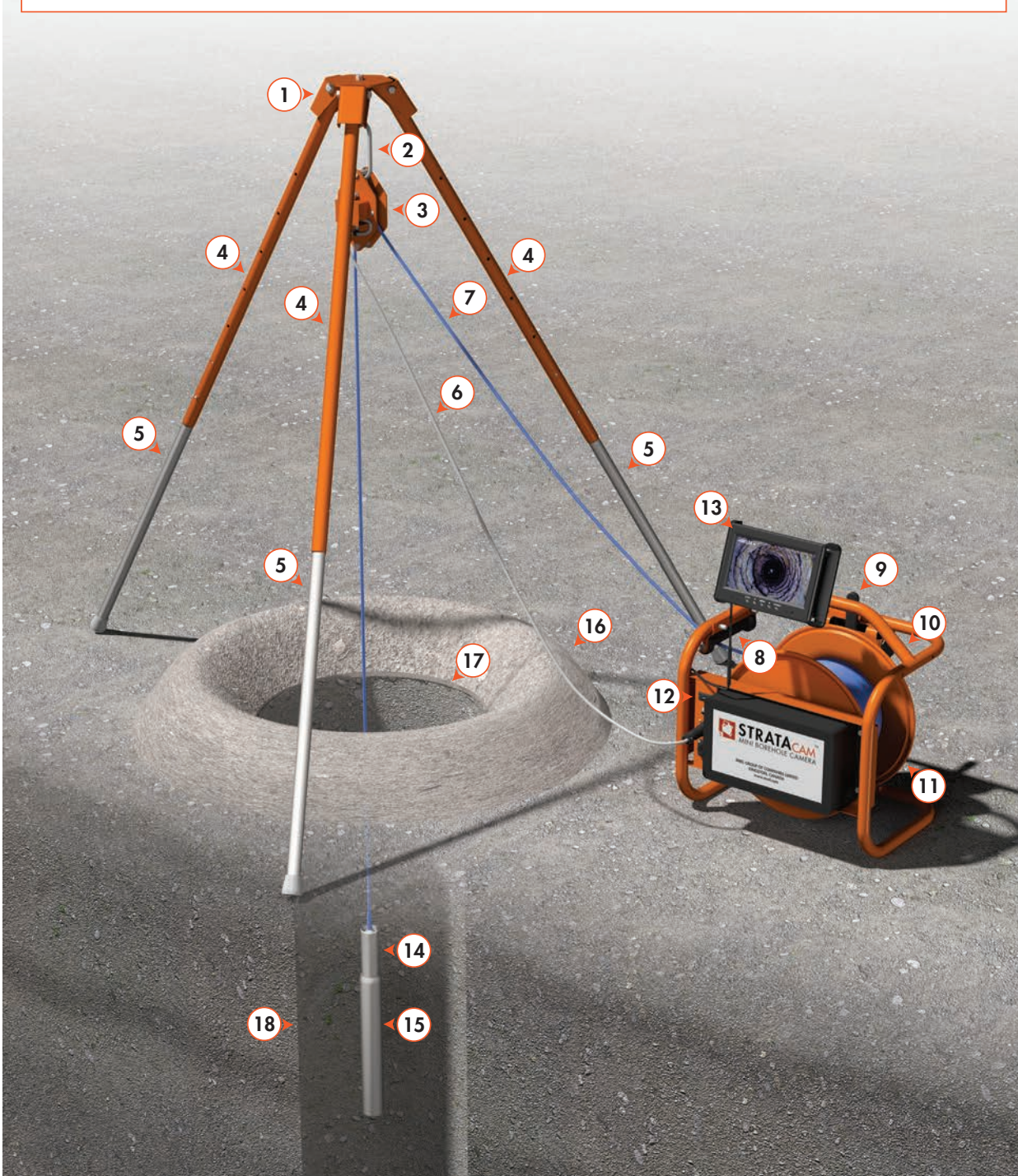
NOTE: Images and details of these hardware components are presented in **Chapter 2**.

1. **StrataCam™ Mini Cable Unit** (as shown in **Section 2.1**)
2. **StrataCam™ Mini Cable Unit - Power Cable** (as shown in **Section 2.1.1**)
3. **StrataCam™ Mini Cable Unit - Monitor Mount** (as shown in **Section 2.1.2**)
4. **StrataCam™ Mini Cable Unit - Monitor** (as shown in **Section 2.1.3**)
5. **StrataCam™ Mini Cable Unit - Monitor Hood** (as shown in **Section 2.1.4**)
6. **StrataCam™ Mini Cable Unit - Monitor Remote and Manual** (as shown in **Section 2.1.5**)
7. **StrataCam™ Mini Cable Unit - Video Capture Device** (as shown in **Section 2.1.6**)
8. **StrataCam™ Mini Tripod** (as shown in **Section 2.2**)
9. **StrataCam™ Mini Encoder** (as shown in **Section 2.2.1**)
10. **StrataCam™ Mini Camerahead** (as shown in **Section 2.3**)
11. **StrataCam™ Mini Battery** (Optional) (as shown in **Section 2.4.1**)
12. **StrataCam™ Mini DVR Recorder** (Optional) (as shown in **Section 2.4.2**)
13. **StrataCam™ Mini Tripod Weight** (Optional) (as shown in **Section 2.4.3**)

Please check that all of the above components are accounted for before proceeding further in the manual. If a component is not present, please contact **MREL Group of Companies Limited**.

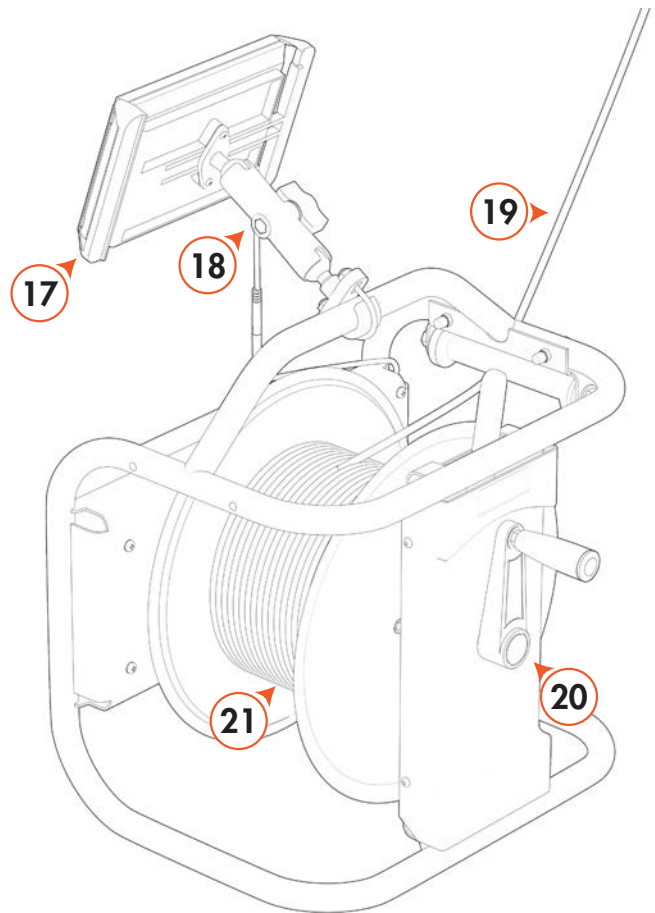
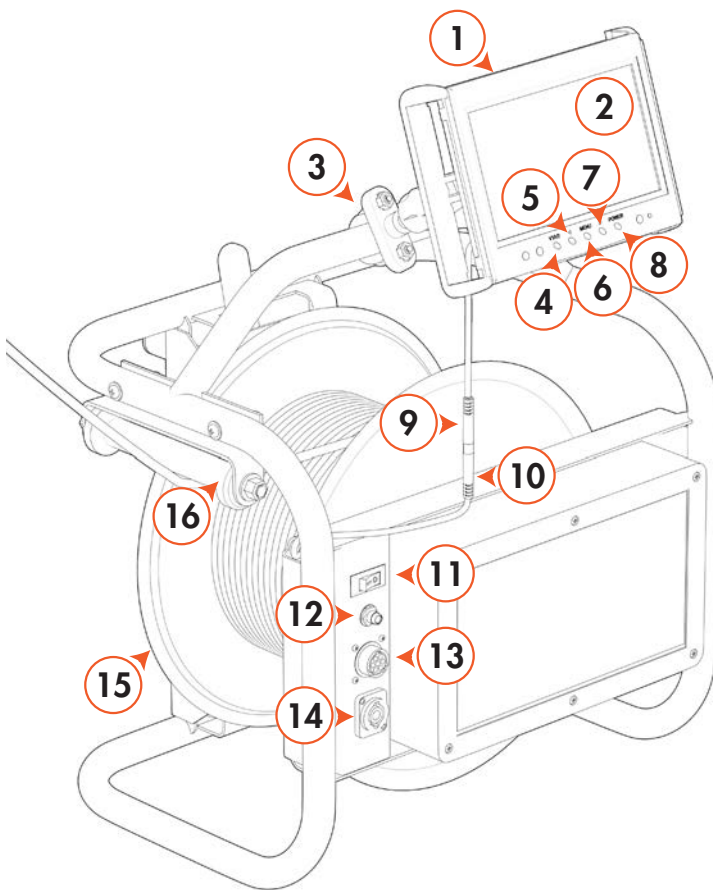
1.3 StrataCam™ Mini Borehole Camera Overview

- | | | |
|------------------------------------|-----------------------|-----------------------------|
| 1. Tripod Top | 7. Camera Cable | 13. Display Monitor |
| 2. Encoder Carabiner | 8. Camera Cable Guide | 14. Camerahead Sheath |
| 3. Encoder | 9. Cable Reel Brake | 15. Camerahead |
| 4. Tripod Leg - Fixed Portion | 10. Cable Reel Handle | 16. Borehole Drill Cuttings |
| 5. Tripod Leg - Extendable Portion | 11. Cable Reel | 17. Borehole Collar |
| 6. Encoder Comms Cable | 12. On / Off Switch | 18. Borehole |



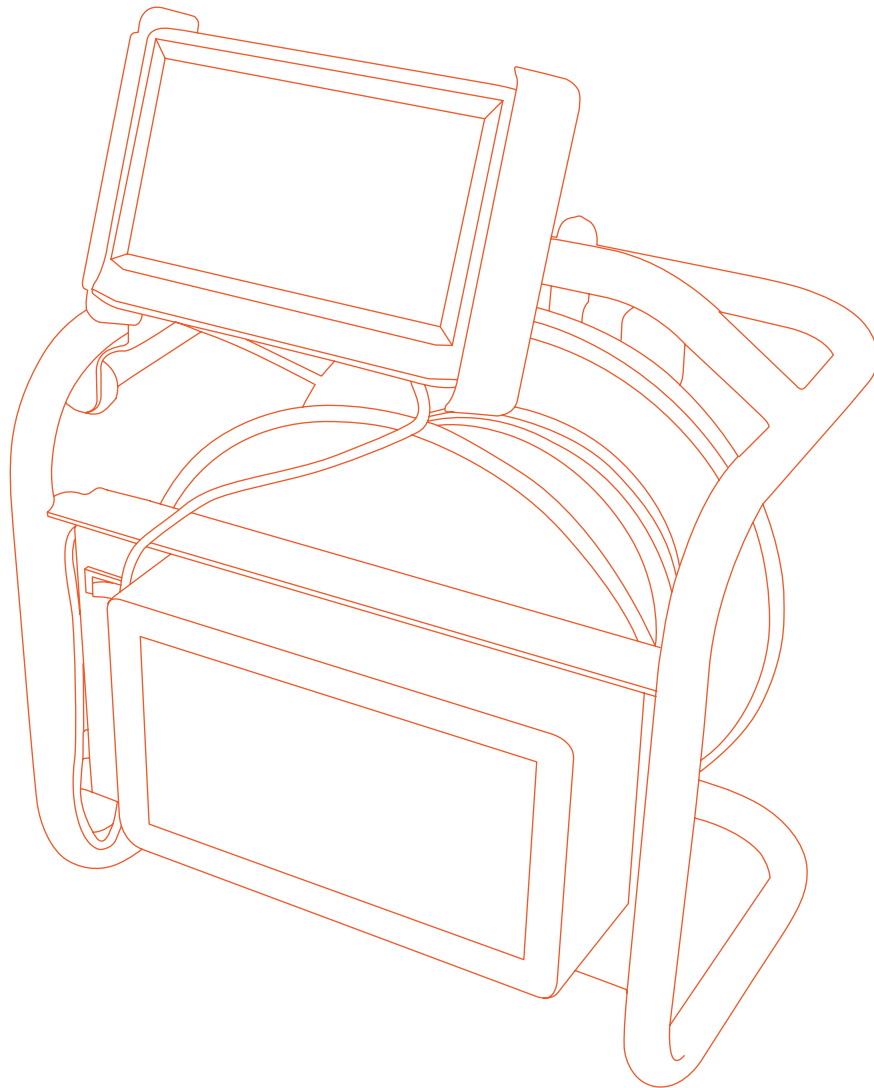
1.4 StrataCam™ Mini Cable Unit

- | | |
|---------------------------------|------------------------------|
| 1. Monitor | 12. RCA Video Out Plug |
| 2. Monitor Display Area | 13. Encoder Cable Plug |
| 3. Monitor Mounting Bracket | 14. Power Cable Plug |
| 4. V1 / V2 Button | 15. Cable Reel Assembly |
| 5. Left Arrow Button | 16. Camerahead Cable Guide |
| 6. Menu Button | 17. Moveable Monitor Mount |
| 7. Right Arrow Button | 18. Mounting Arm |
| 8. Power Button | 19. Camerahead Cable |
| 9. Video Cable from Monitor | 20. Collapsible Reel Handle |
| 10. Video Cable from Cable Unit | 21. Camerahead Cable on Reel |
| 11. On / Off Switch | |



Chapter 2

Hardware Components



Overview

This Chapter describes all of the hardware components provided with the StrataCam™ Mini Borehole Camera.

2.1 StrataCam™ Mini Cable Unit

The **StrataCam™ Mini Cable Unit** of the unit houses the Camera Cable and Reel Assembly.



2.1.1 StrataCam™ Mini Cable Unit - Power Cable

This cable connects to a 12 Volt DC power source to the **StrataCam™ Mini Cable Unit**. It provides power to the **StrataCam™ Mini Borehole Camera**.



2.1.2 StrataCam™ Mini Cable Unit - Monitor Mount

This is to attach the Monitor to the **StrataCam™ Mini Cable Unit**.



2.1.3 StrataCam™ Mini Cable Unit - Monitor

This is the main display for the **StrataCam™ Mini Borehole Camera**.



2.1.4 StrataCam™ Mini Cable Unit - Monitor Hood

This hood is affixed to the **StrataCam™ Mini Cable Unit - Monitor** with the provided velcro fasteners and provides shade to the monitor for ease of use in direct sunlight or bright conditions.



2.1.5 StrataCam™ Mini Cable Unit - Monitor Remote and Manual

The **Remote and Manual** for the **StrataCam™ Mini Cable Unit - Monitor** are included with the unit to describe all of the functions of the monitor, and to allow for ease of use with the **Cable Unit - Monitor Hood** installed.



2.1.6 StrataCam™ Mini Cable Unit - Video Capture Device

This device allows the user to record the video shown on the **StrataCam™ Mini Monitor** screen to a computer with a USB port (not supplied).



2.2 StrataCam™ Mini Tripod



The **StrataCam™ Mini Tripod** allows the **StrataCam™ Mini Camera** to be positioned directly above the Borehole.

2.2.1 StrataCam™ Mini Encoder

This positions the **StrataCam™ Mini Camera** centrally over the Borehole as well as encoding the distance travelled by the **StrataCam™ Mini Camera**, which is shown on the **StrataCam™ Mini Monitor**. The **Encoder** connects to the eyelet on the **Tripod**.



2.3 StrataCam™ Mini Camerahead

The **StrataCam™ Mini Camerahead** connects to the end of the cable on the **Cable Reel** to be lowered down the borehole. The unit has one camera, which looks downward. The **StrataCam™ Mini Camerahead** can be operated from temperatures 0°C - 60°C (32°F - 140°F).



2.4 StrataCam™ Mini Optional Equipment

2.4.1 StrataCam™ Mini Battery and Charger (Optional)

The **StrataCam™ Mini Battery** is a **12-Volt DC** power source for the unit to operate independently. Included is a battery charger capable of accepting 100-240 VDC.



2.4.2 StrataCam™ Mini 12 VDC Portable DVR Video Recorder (Optional)

This unit provides the ability to record video from the **StrataCam™ Mini** to a microSD card for ultimate recording convenience without PC. The unit connects directly to the **StrataCam™ Mini Borehole Camera**.



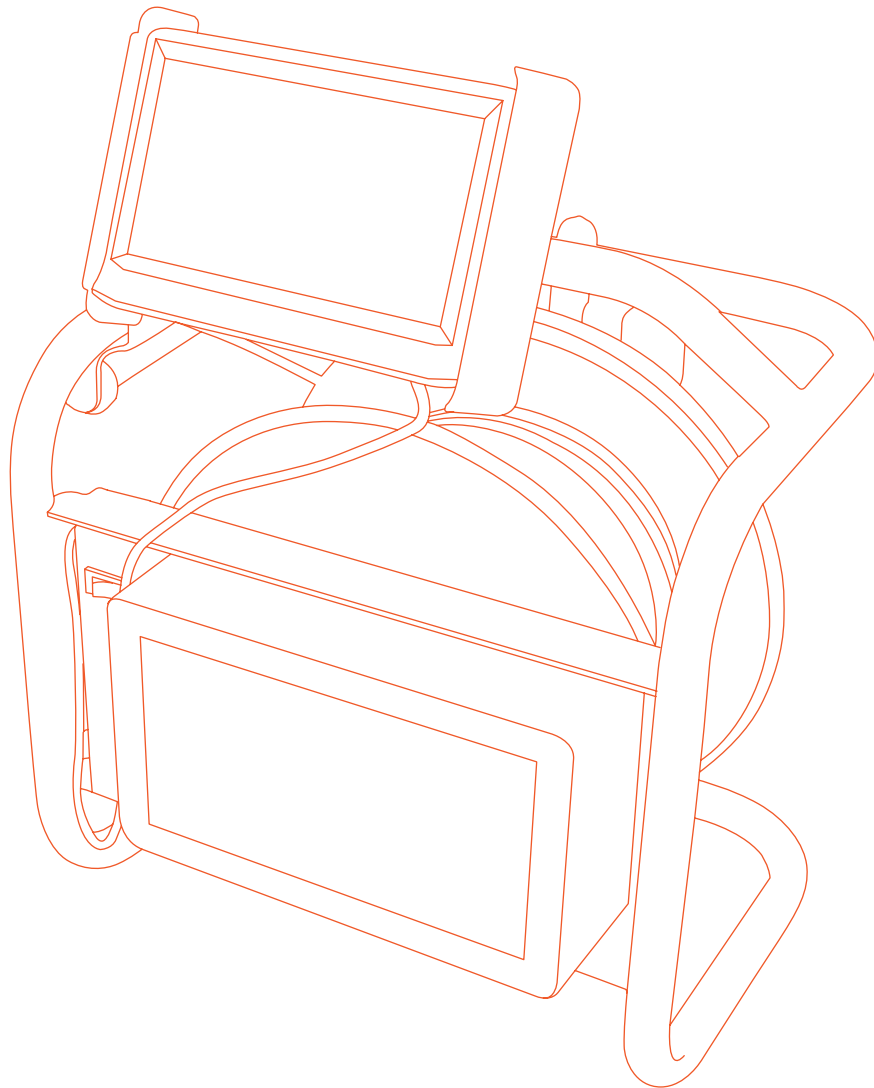
2.4.3 StrataCam™ Mini Tripod Weight (Optional)

The optional weight can be supplied to increase the stability of the Tripod.



Chapter 3

Setting Up the StrataCam™ Mini



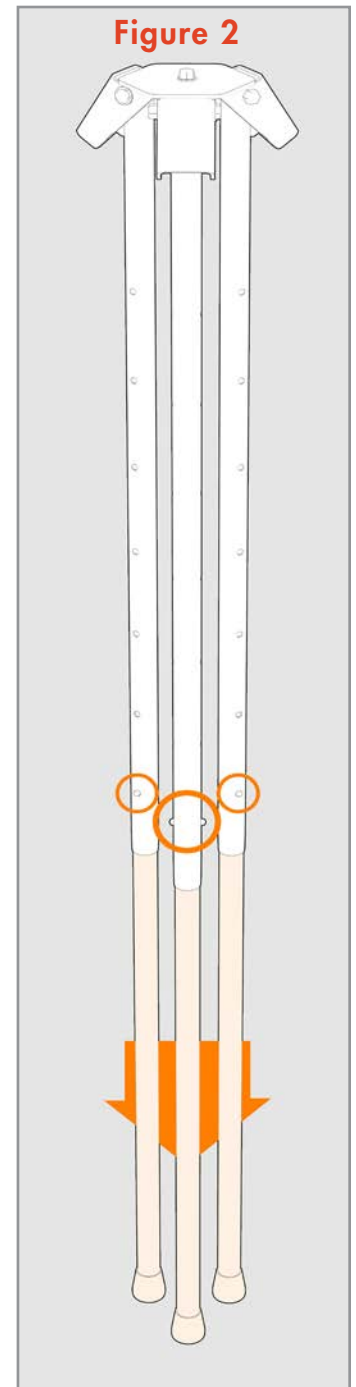
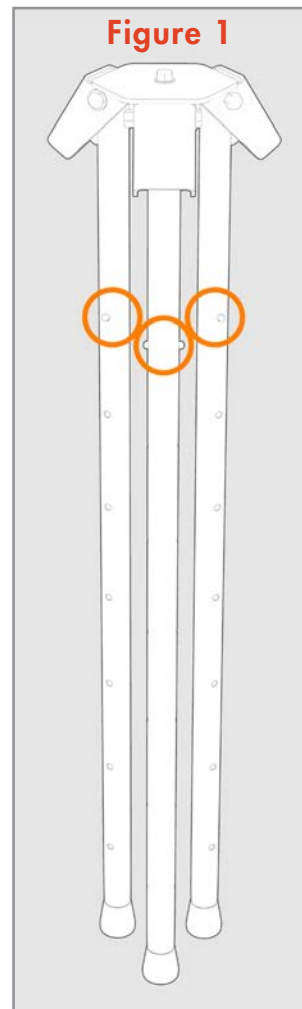
Overview

This Chapter describes in detail setting up the StrataCam™ Mini Borehole Camera for the first time. This should be completed by the Operator before the StrataCam™ Mini Borehole Camera goes into the field to ensure all of the components have been received and that the StrataCam™ Mini Borehole Camera is ready for use.

3.1 StrataCam™ Mini Borehole Camera Setup

3.1.1 StrataCam™ Mini Tripod Setup

Each leg of the **StrataCam™ Mini Tripod** has a pin as marked in circles in **Figure 1**. Push in both sides of the pin and extend each leg to their fullest extent, making sure that the pin is released into the last holes on the leg as marked in the circles in **Figure 2**.



Once the **StrataCam™ Mini Tripod** legs are fully extended, open up the legs to their maximum position as shown in **Figure 3**, and position the **StrataCam™ Mini Tripod** in an open area.

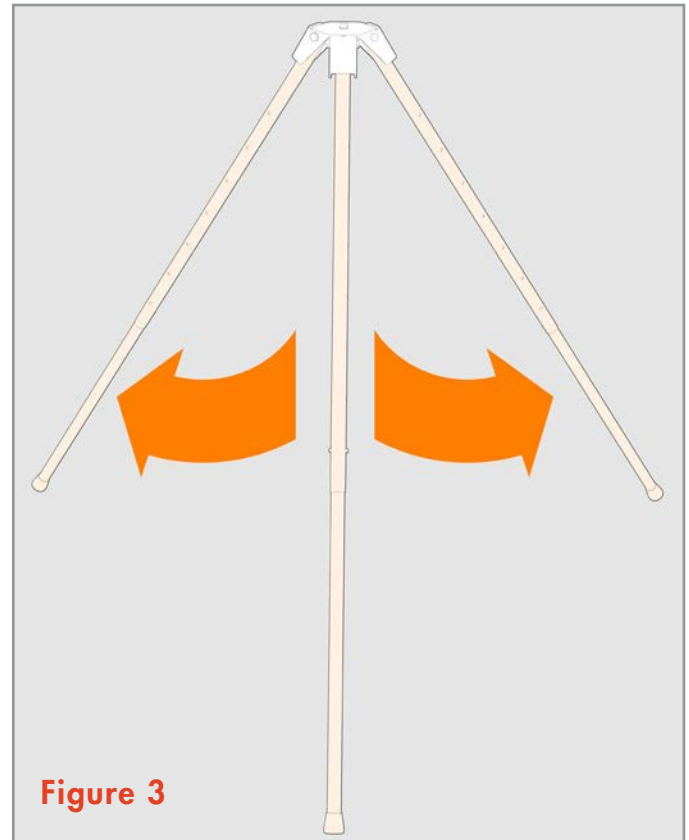


Figure 3

With the **StrataCam™ Mini Encoder**, open up the **Carabiner** at the top of the **StrataCam™ Mini Encoder** and hook it into the hanging bolt underneath the **StrataCam™ Mini Tripod** as shown in **Figure 4**.

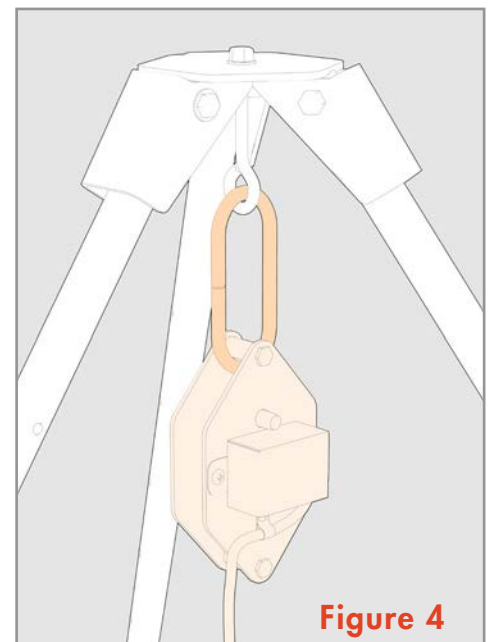
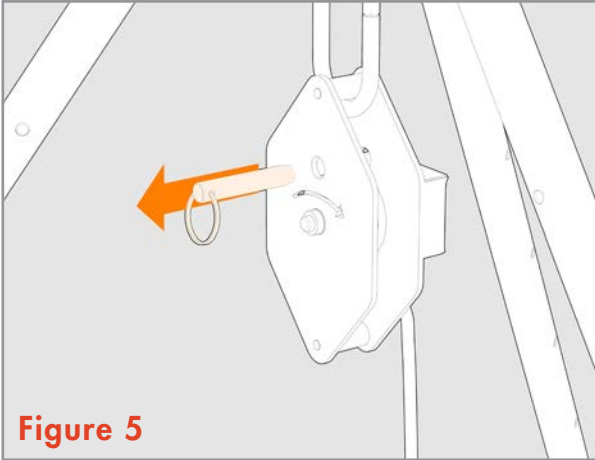
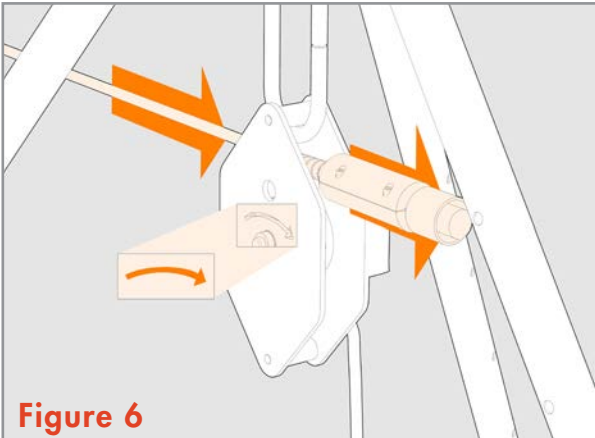


Figure 4

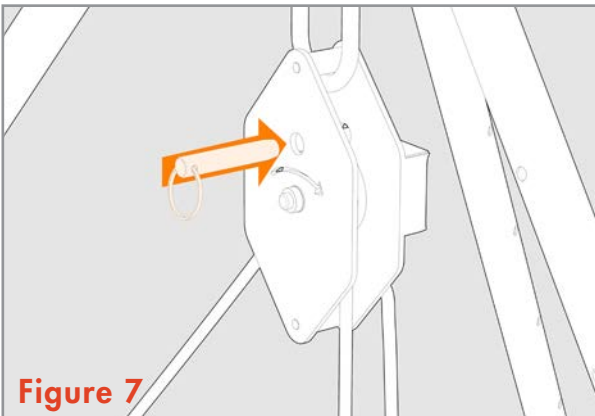


Next place the **StrataCam™ Mini Cable Unit** next to the **StrataCam™ Mini Tripod**.

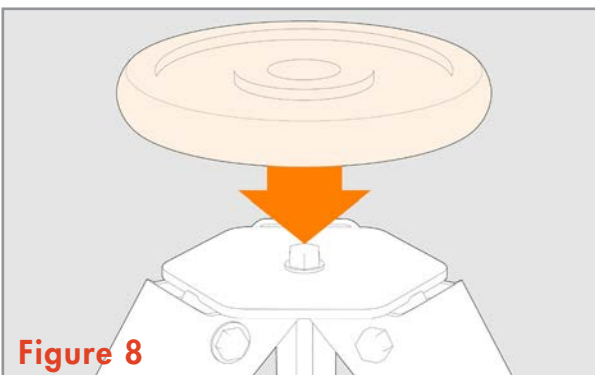
Remove the locking pin from the **StrataCam™ Mini Encoder** as shown in **Figure 5**.



Locate the **Connection End** for the **StrataCam™ Mini Camera** attached to the **StrataCam™ Mini Cable Unit** and pass it through the **StrataCam™ Mini Encoder** as shown in **Figure 6**. Make sure that the **Connection End** passes through the **StrataCam™ Mini Encoder** in the direction of the **Arrow** highlighted in **Figure 6**, this will ensure that the depth readings shown on the **StrataCam™ Mini Monitor** will be correct.



Once the **Connection End** is correctly through the **StrataCam™ Mini Encoder**, reinsert the locking pin as shown in **Figure 7**.



Finally, add the optional weight to the top of the **StrataCam™ Mini Tripod** if purchased as shown in **Figure 8**.

3.2 StrataCam™ Mini Camerahead Setup

Unscrew and remove the **StrataCam™ Mini Camerahead Sheath** as highlighted in **Figure 9**.

3.2.1 StrataCam™ Mini Camerahead Setup - Camerahead Sheath

Locate the **Connection End** of the video cable hanging from the **StrataCam™ Mini Encoder** and pass it through the **StrataCam™ Mini Camerahead Sheath** as shown in **Figure 10**.

3.2.2 StrataCam™ Mini Camera Setup - Connecting Camerahead

Before connecting the **StrataCam™ Mini Camerahead** to the **Connection End** inspect the O-rings in both connectors to be sure they are clear of debris or any contamination. Also check for any wear or damage. The O-rings should also be lubricated on a regular basis. Use a **NEMA-Rated O-ring lubricant**.

Now connect the **Connection End** into the **StrataCam™ Mini Camerahead**, as shown in **Figure 11**. The **Connection End** will fit only one way, and twist clockwise to secure the **StrataCam™ Mini Camerahead** connection.

3.2.3 StrataCam™ Mini Camerahead Setup - Reconnecting the Camerahead Sheath

Slide the **Camerahead Sheath** back down over the **Connection End** as shown in **Figure 12** and twist clockwise to secure it to the **Camerahead**.

3.2.4 StrataCam™ Mini Camerahead Setup - Complete

Your **StrataCam™ Mini Camerahead** should now look like **Figure 13**. It is now ready to be used.

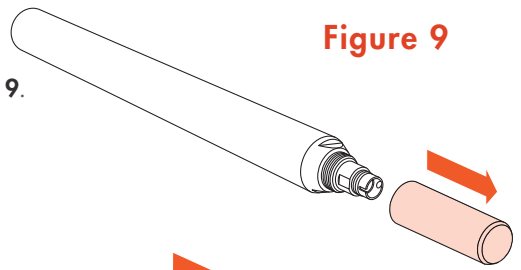


Figure 9

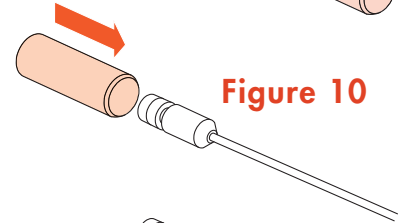


Figure 10

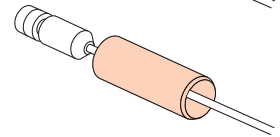


Figure 11

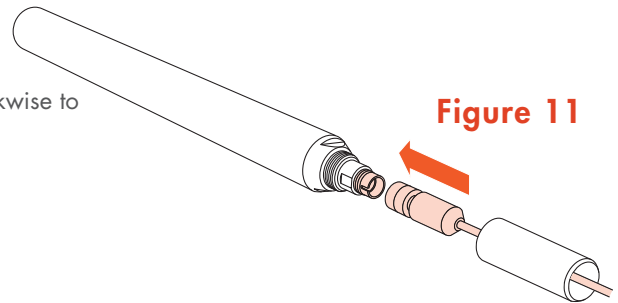


Figure 12

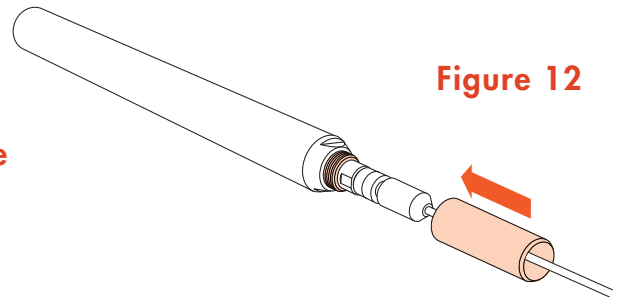


Figure 13

STOP

Inspect the camera before using for any cracks. If a crack is found, do not use the **StrataCam™ Mini Camerahead** and contact **MREL Group of Companies Limited**.

3.3 StrataCam™ Mini Monitor

3.3.1 StrataCam™ Mini - Monitor Mount

If not already mounted on to the **StrataCam™ Mini Cable Unit**, attached the bottom mounting bracket as shown in **Figure 14** to the handle tube on the **StrataCam™ Mini Cable Unit**. Tighten the bolts of the bottom mounting bracket until tight enough to allow the bracket to move only slightly, be sure to not over tighten the bracket as this could cause damage to the **StrataCam™ Mini Cable Unit**.

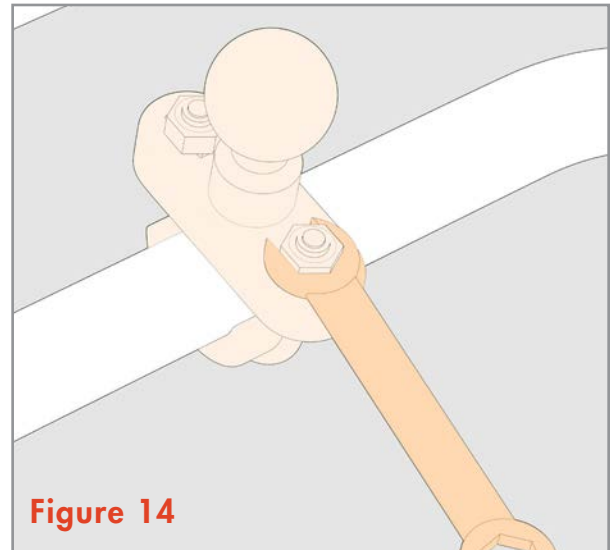


Figure 14

Attach the mounting arm to the bottom bracket as shown in **Figure 15**.

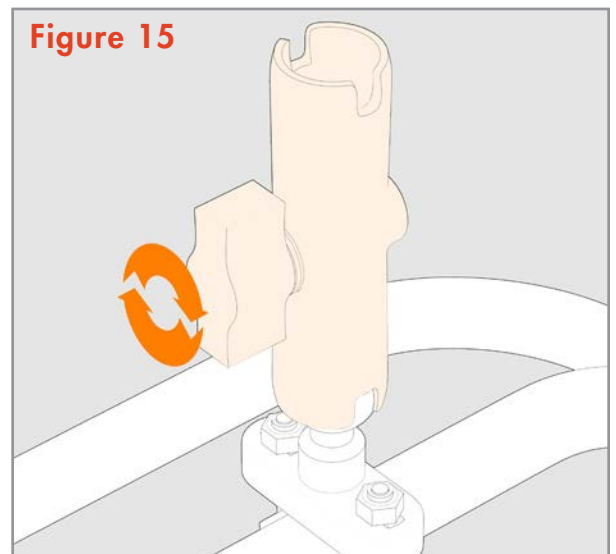


Figure 15

Attach the top mounting bracket with the monitor mount to the mounting arm as shown in **Figure 16**. Tighten and loosen the knob as highlighted in **Figure 16** to alter the position of the monitor.

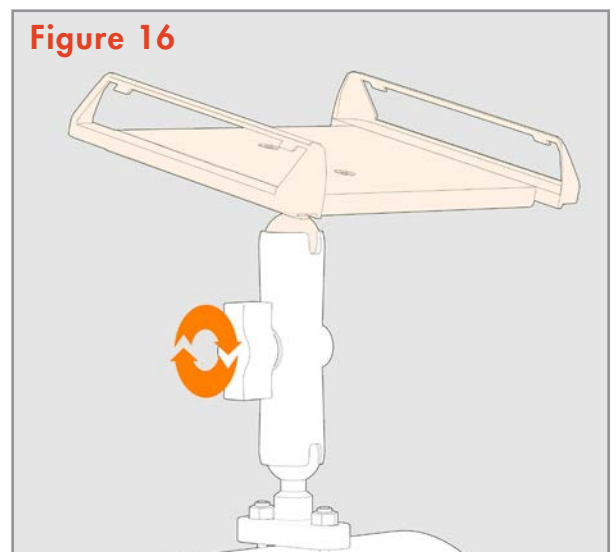
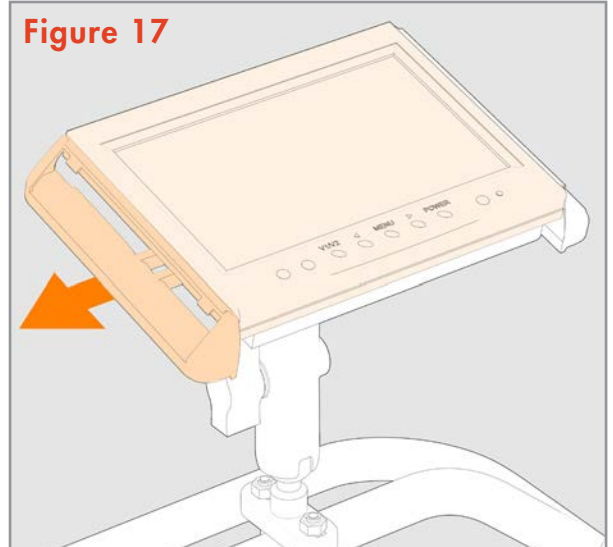


Figure 16

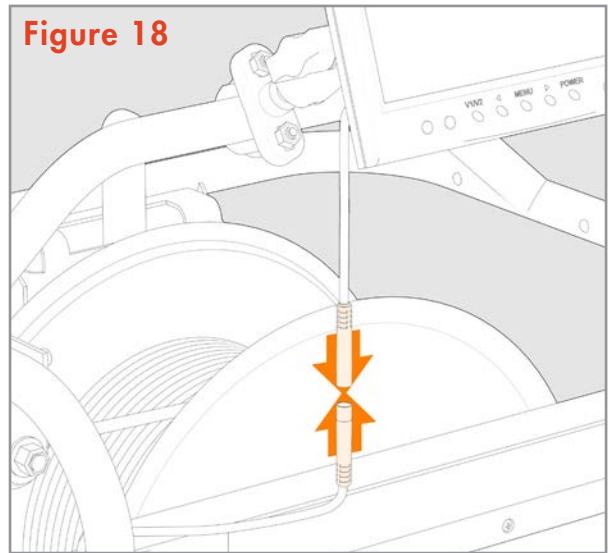
Slide out the component shown in **Figure 17** and place the **StrataCam™ Mini Monitor** as shown in **Figure 17**.

Figure 17



With the **StrataCam™ Mini Monitor** now mounted on to the **StrataCam™ Mini Cable Unit**, connect together the video wires from the **StrataCam™ Mini Monitor** and the **StrataCam™ Mini Cable Unit** shown in **Figure 18**.

Figure 18



3.4 StrataCam™ Mini Connections

3.4.1 StrataCam™ Mini Connections - Encoder Cable

Connect the cable from the **StrataCam™ Mini Encoder** now attached to the **StrataCam™ Mini Tripod** to the outlet on the **StrataCam™ Mini Cable Unit** as shown in **Figure 19**.

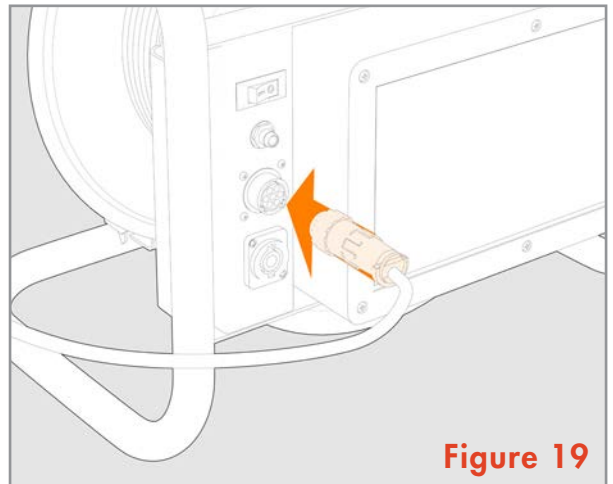


Figure 19

3.4.2 StrataCam™ Mini Connections - Power

Connect the **Power Cable**, whether from the **StrataCam™ Mini Battery** (sold separately) or from the provided **Power Cable** connected to a 12 Volt DC battery, to the outlet on the **StrataCam™ Mini Cable Unit** as shown in **Figure 20**. Ensure that there is sufficient power to power the **StrataCam™ Mini Cable Unit**.

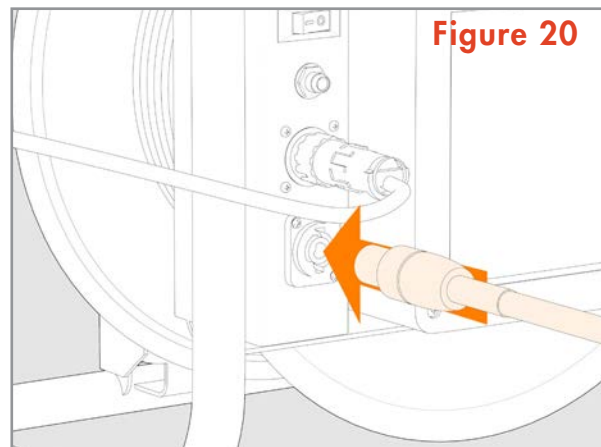


Figure 20

Now press the **On button** shown in **Figure 21** to turn on the **StrataCam™ Mini Cable Unit**. The **StrataCam™ Mini Cable Unit** will start and the monitor should show the image coming from the **StrataCam™ Mini Camera**.

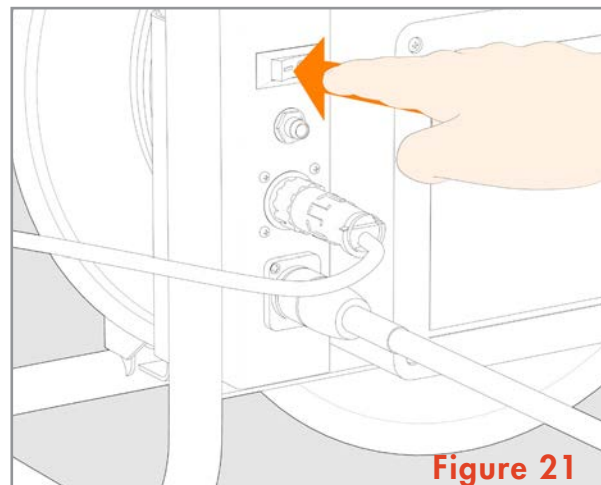


Figure 21

Now turn on the **StrataCam™ Mini Monitor** as shown in **Figure 22** to view what the **StrataCam™ Mini Camera** sees.

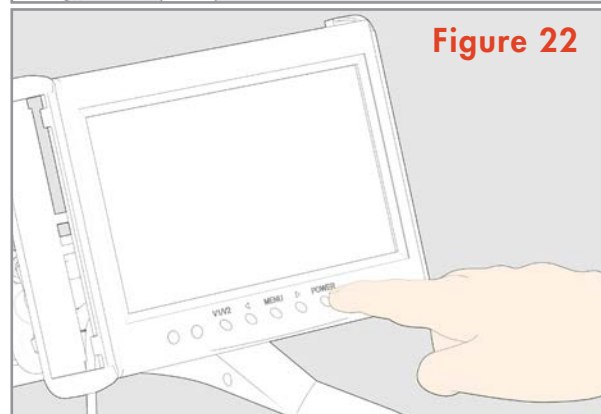


Figure 22

3.4.3 StrataCam™ Mini Monitor Installation - Monitor Hood (Optional)

When using the **StrataCam™ Mini Borehole Camera** in direct sunlight or bright areas, use the **Monitor Hood** to shield the **StrataCam™ Mini Monitor** from light, as shown in **Figure 23**. The **Monitor Hood** is affixed to the **StrataCam™ Mini Monitor** using velcro pads that are adhered to the back of the **StrataCam™ Mini Monitor** by removing their plastic backings. These pads come already attached to the velcro on the **Monitor Hood**.

NOTE: Use of the **Monitor Hood** will inhibit the function of the buttons on the **StrataCam™ Mini Monitor**. To adjust **Brightness**, **Contrast**, **Saturation**, and **Hue** settings with the **Monitor Hood** installed, use the **StrataCam™ Mini Monitor Remote Control** enclosed in the **Monitor** packaging.

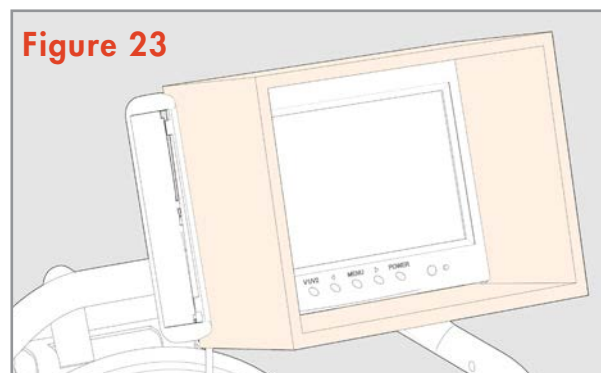


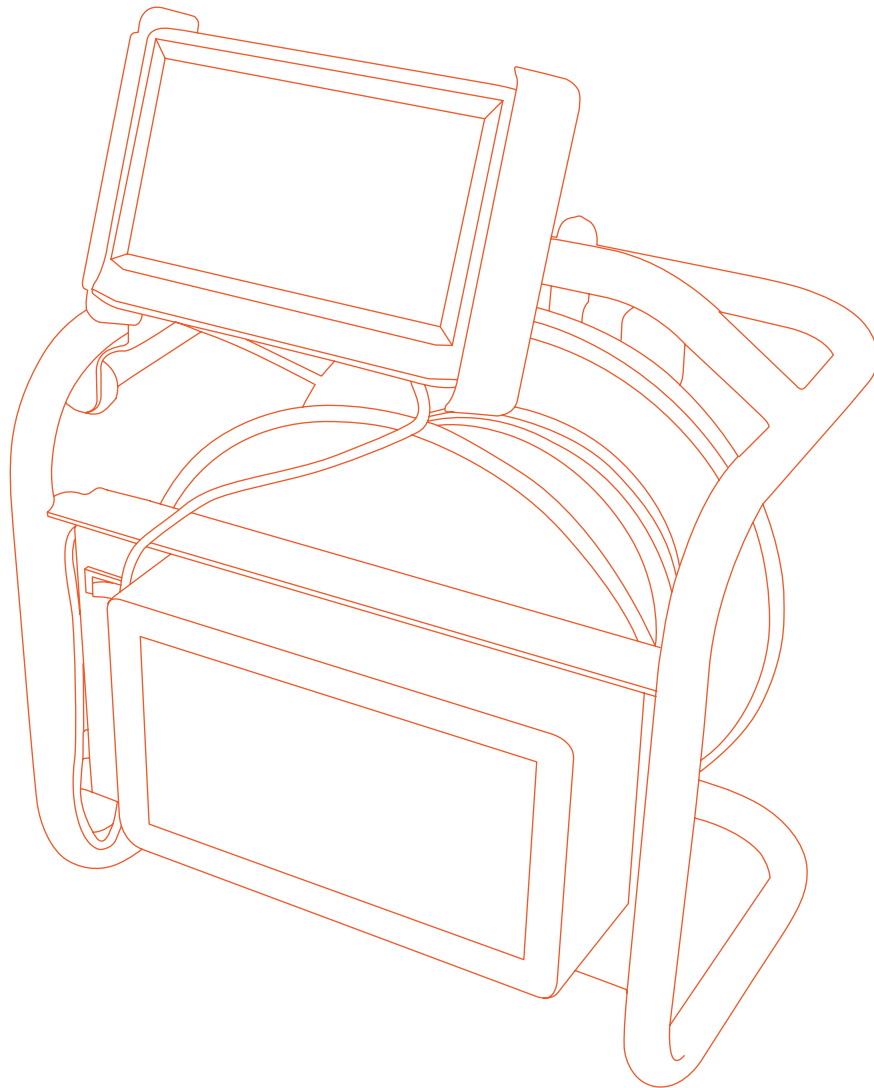
Figure 23

The StrataCam™ Mini Borehole Camera is now ready to be used.



Chapter 4

StrataCam™ Mini Usage In The Field



Overview

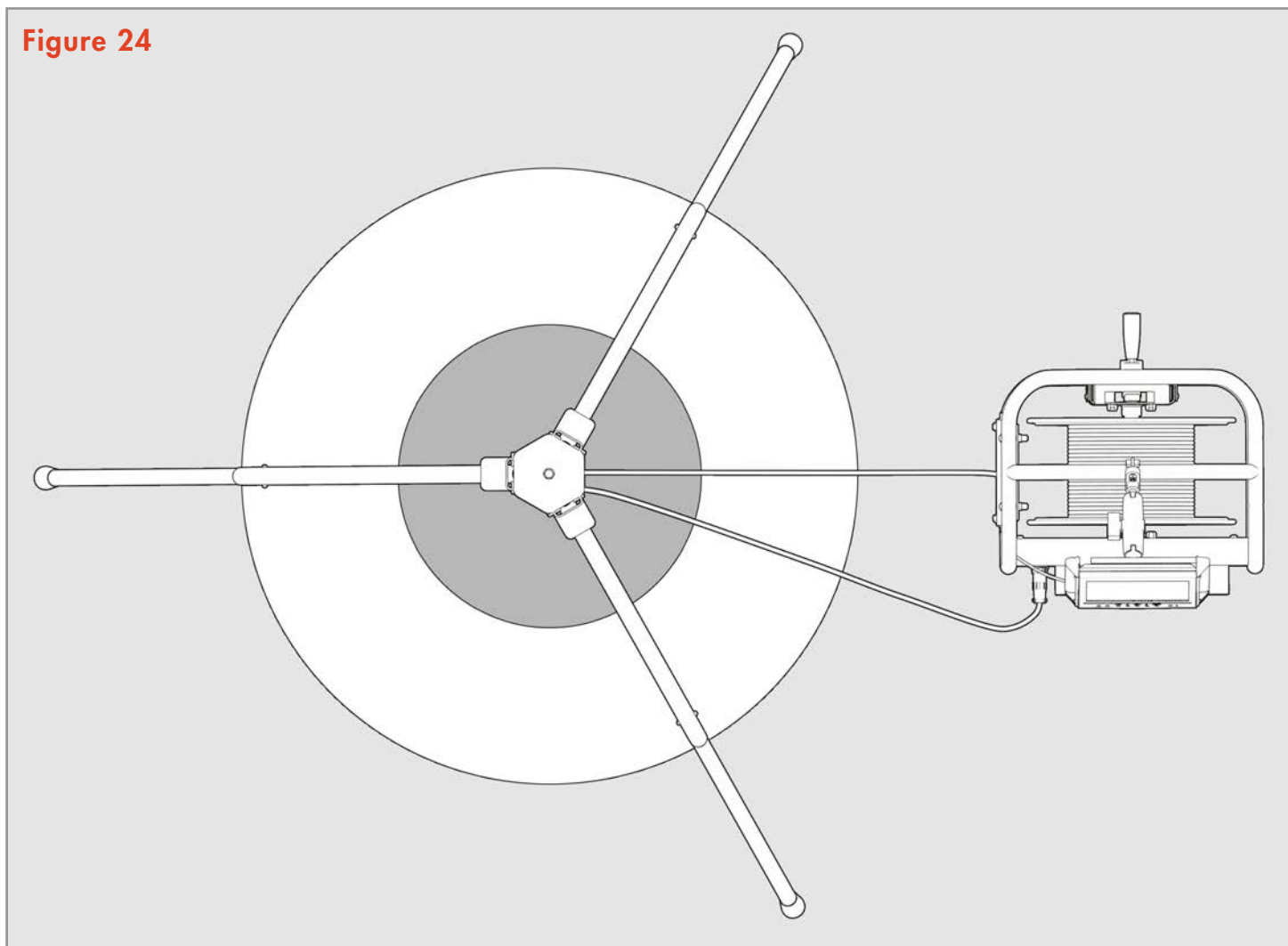
The StrataCam™ Mini Borehole Camera is used to clearly view and accurately record the physical location of geological strata, weak/strong boundaries, ore/waste boundaries, coal seams, top of coal, water surface or ingress points, in-situ fractures, cavities, and irregularities. With the StrataCam™ Mini Borehole Camera, you can make sure your Borehole is clean and ready for explosives without worry.

4.1 StrataCam™ Mini Borehole Camera in the Field

4.1.1 Positioning Your StrataCam™ Mini Borehole Camera

Position the **StrataCam™ Mini Tripod** directly over the hole as shown in **Figure 24**.

Figure 24



Plug in the **optional StrataCam™ Mini Battery** or other 12 Volt DC power source (from the cable provided) into the **StrataCam™ Mini Cable Unit**.

IMPORTANT

If applicable, one fully charged **StrataCam™ Mini Battery** will last approximately 4 - 5 hours of normal usage.



4.1.2 Using The StrataCam™ Mini Borehole Camera

Once in position over the Borehole, press the **POWER ON** switch on the **StrataCam™ Mini Cable Unit** as shown in **Figure 25**. The monitor shown now display the feed coming from the camera positioned above the Borehole. The **StrataCam™ Mini Camerahead** should also now light up if visible. Powering on the unit will reset the distance measurement to zero. Ensure that the camerahead is at the collar of the hole when powering on the unit.

Once you are satisfied that the **StrataCam™ Mini Borehole Camerahead** components are working correctly, check the monitor for correct display information. You are now ready to lower the camera into the borehole.

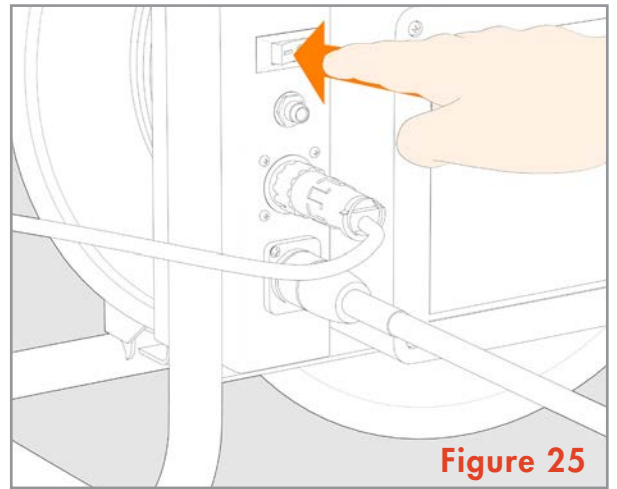


Figure 25

IMPORTANT

Powering on the unit will reset the distance measurement to zero.

4.1.3 Lowering The StrataCam™ Mini Borehole Camera

To lower the **StrataCam™ Mini Camerahead** down the Borehole, start by releasing the reel brake in the direction shown in **Figure 26**. Be sure to place your other hand on the **StrataCam™ Mini Reel Handle** so that the **StrataCam™ Mini Camerahead** does not start falling down the Borehole.

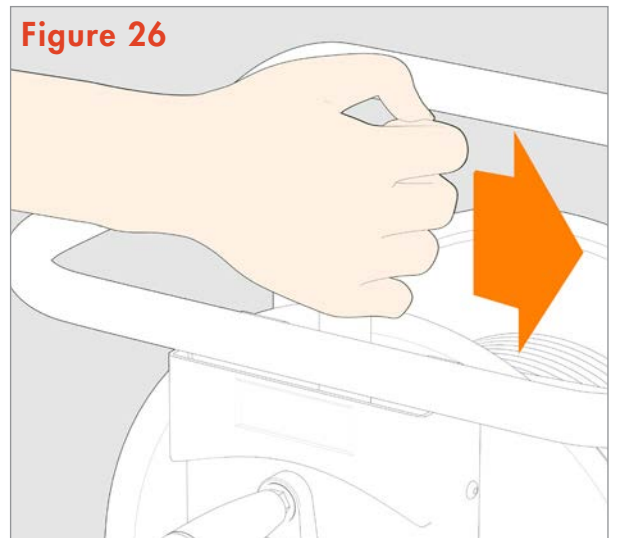


Figure 26

IMPORTANT

Be sure to note the depth of the borehole you are investigating so that you do not strike the bottom of the borehole with the camerahead.

Rotate the **StrataCam™ Mini Reel Handle** as shown in **Figure 27** to lower the **StrataCam™ Mini Camerahead** down the Borehole.

When you wish to stop lowering the **StrataCam™ Mini Camerahead** be sure to reapply the reel brake.

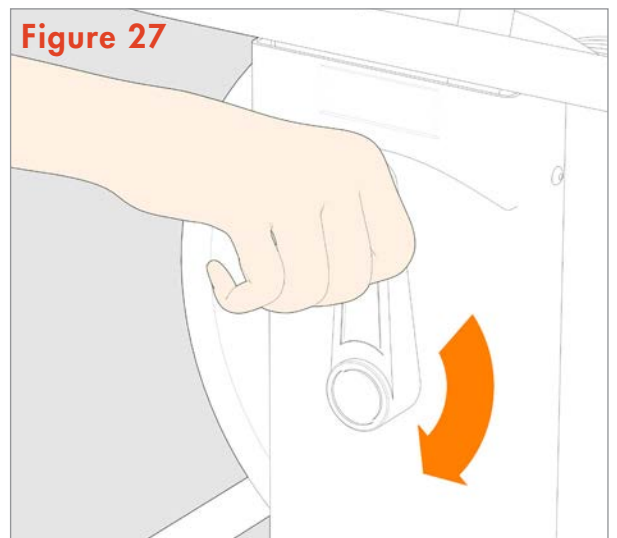


Figure 27

4.1.4 Raising the StrataCam™ Mini Borehole Camera

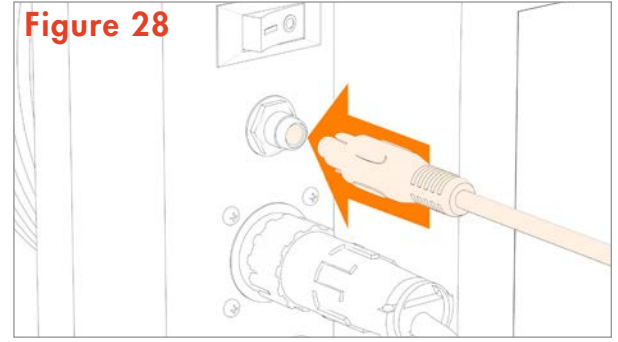
When ready to raise the **StrataCam™ Mini Borehole Camerahead**, unlock the reel brake once again and rotate the **StrataCam™ Mini Reel Handle** in the opposite direction from lowering. When the **StrataCam™ Mini Borehole Camerahead** is out of the borehole, be sure to relock the reel brake.

4.2 Using the StrataCam™ Mini Video Capture Device

To record what the **StrataCam™ Mini Borehole Camera** sees, you will need to use the **StrataCam™ Mini Video Capture Device** provided with the **StrataCam™ Mini Borehole Camera** and a **computer** (not provided).

Plug in the yellow **Video Connection Cable** into the **StrataCam™ Mini Cable Unit** as shown in **Figure 28**.

Figure 28



To StrataCam™ Mini Video Capture Device

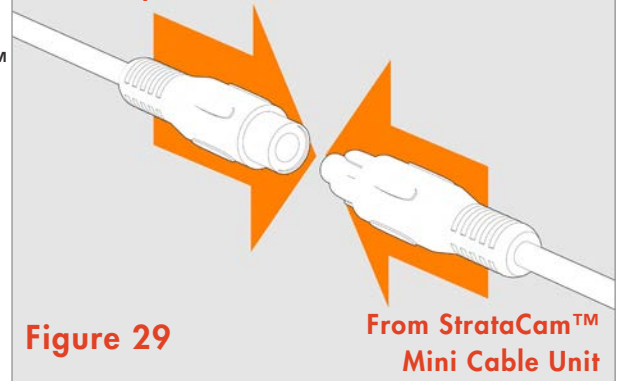


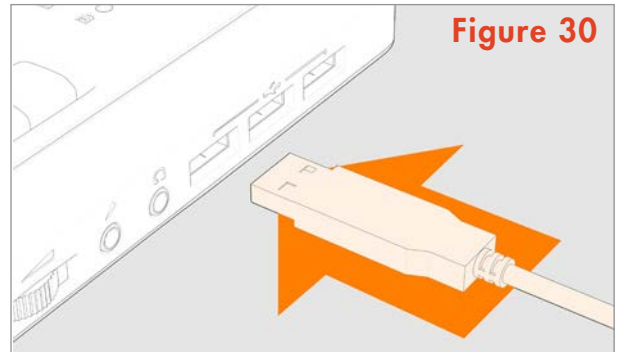
Figure 29

From StrataCam™ Mini Cable Unit

Connect the yellow **Video Connection Cable** into the yellow **Video Connection Cable** coming from the provided **StrataCam™ Mini Video Capture Device** as shown in **Figure 29**.

Connect the **USB Cable** from the **StrataCam™ Mini Video Capture Device** to your computer as shown in **Figure 30**. Be sure to have installed the provided drivers from the **StrataCam™ Mini Video Capture Device** box on your computer before using.

Figure 30

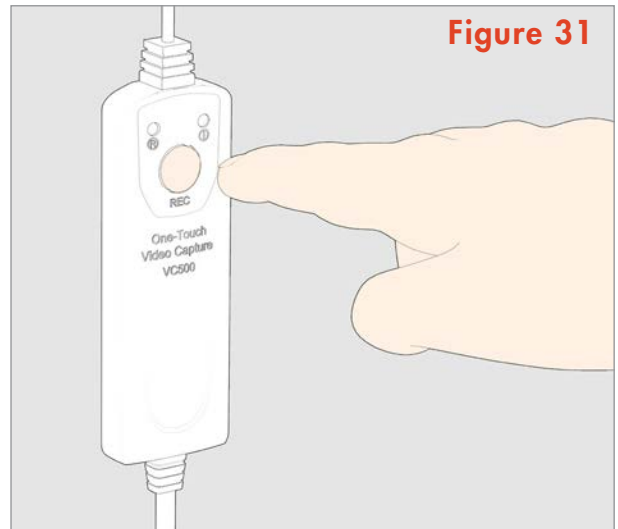


IMPORTANT

The computer has to be with in the field next to the **StrataCam™ Mini** to capture the video of the borehole.

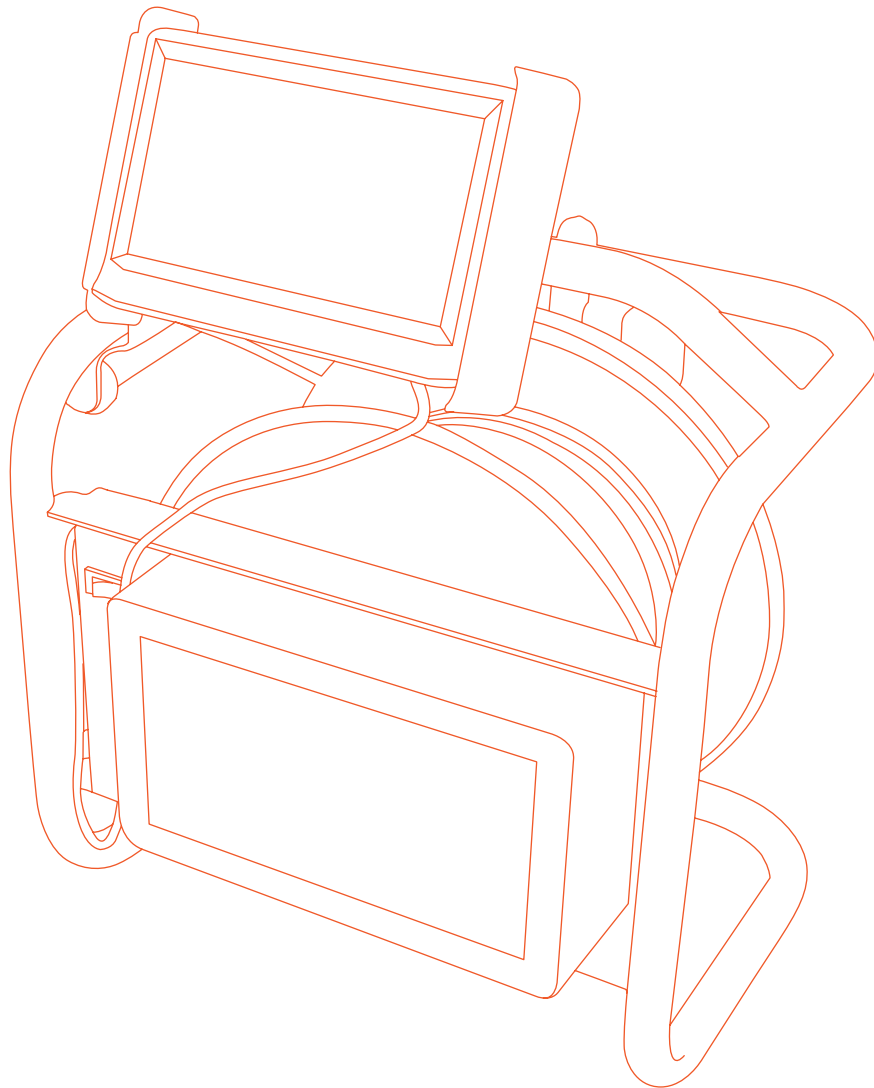
Once the computer is ready and you want to begin recording the video feed from the **StrataCam™ Mini Camerahead**, press the button on the **StrataCam™ Mini Video Capture Device** as shown in **Figure 31**. To stop recording, press the button on the **StrataCam™ Mini Video Capture Device** once again.

Figure 31



Chapter 5

Troubleshooting



5.1 Troubleshooting

The Depth Counter Is Inaccurate

This can happen when the cable is not going directly over the roller of the Encoder, directly down the Borehole. If you have a tripod over the hole and the cable is running downhill to the tripod, or even at a flat angle, it's possible that the cable will slip as it contacts the roller (where the encoder is for the depth counter). You can eliminate that slippage by installing the encoder so that the cable is running uphill to the encoder from the **StrataCam™ Mini Cable Unit**.

StrataCam™ Mini Battery (optional) Voltage Too Low

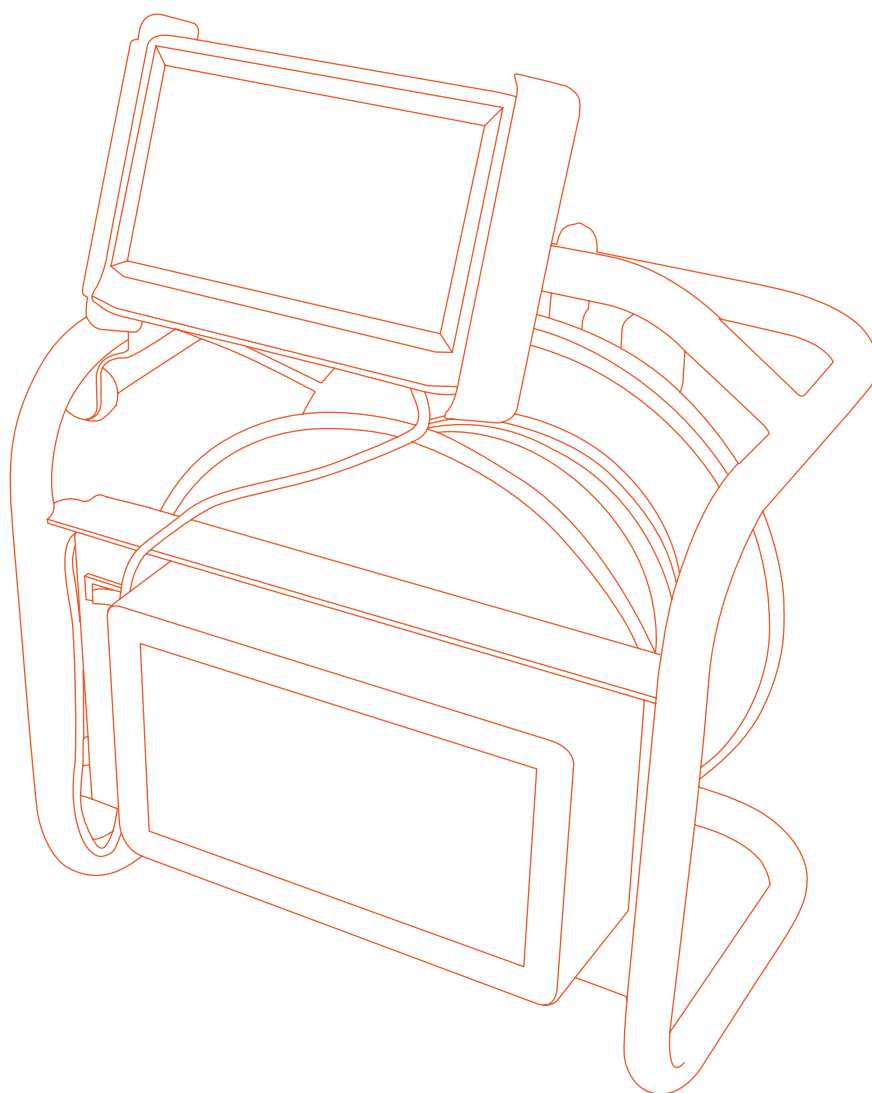
This is the number one cause of problems with the system. Always keep your **StrataCam™ Mini Battery** fully charged and make a habit of returning it to AC power for charging after each use. The lead-acid battery should be connected to the battery charger supplied when not in use.

Problem Not Found?

If you have a problem that is not outlined in this section, please review each section of this manual and follow all instructions for the beginning. If the problem still persists, please contact **MREL Group of Companies Limited**. Our contact information is in **Chapter 6**.

Chapter 6

Contacting MREL for Technical Support



6.1 Contacting MREL

MREL Group of Companies Limited

Blasting Instrumentation Team

5-779 Sir John A MacDonald Blvd.
Kingston, Ontario K7L 1H3
Canada

Toll Free Canada/USA: +1-877-544-MREL

Tel: +1-613-545-0466

Email: support@mrel.com

Webpage Support: www.mrel.com/contact.html

MREL looks forward to providing you with assistance.



MREL is committed to product innovation; accordingly product may undergo specification improvements without notice.

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