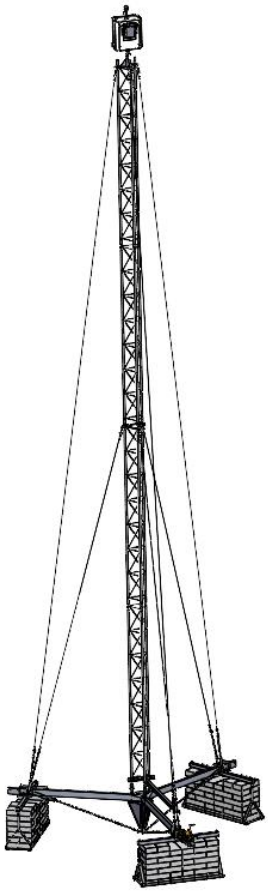
kuva
GAS CLOUD IMAGING

Kuva Systems
User Manual



510-0776 Rev B (2023/07/18)

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1 Important notices

1.1 Legal notice

SOME KUVA SYSTEMS EQUIPMENT CONTAINS, AND THE SOFTWARE ENABLES, AUDIO/VISUAL AND RECORDING CAPABILITIES, THE IMPROPER USE OF WHICH MAY SUBJECT YOU TO CIVIL AND CRIMINAL PENALTIES, APPLICABLE LAWS REGARDING THE USE OF SUCH CAPABILITIES VARY BETWEEN JURISDICTIONS AND MAY REQUIRE, AMONG OTHER THINGS, EXPRESS WRITTEN CONSENT FROM RECORDED SUBJECTS. YOU ARE SOLELY RESPONSIBLE FOR INSURING STRICT COMPLIANCE WITH SUCH LAWS AND FOR STRICT ADHERENCE TO ANY/ALL RIGHTS OF PRIVACY. USE OF THIS EQUIPMENT AND/OR SOFTWARE FOR ILLEGAL SURVEILLANCE OR MONITORING SHALL BE DEEMED UNAUTHORIZED USE IN VIOLATION OF THE END USER SOFTWARE AGREEMENT AND RESULT IN THE IMMEDIATE TERMINATION OF YOUR LICENSE RIGHTS THEREUNDER.

1.2 Regulatory notices

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio & television interference

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential environment is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment may void your authority to operate this equipment under Federal Communications Commission rules.

Compliant to CAN ICES-3 (A)

1.3 Warranty statement

For the most up to date version of Kuva Systems' warranty, visit *www.kuvasystems.com/warranty*.

Hardware warranty. In the case of failure of the Kuva Hardware to function substantially in accordance with this Agreement during the first twelve (12) months of operation following installation (the "Warranty Period"), Kuva will ship a replacement of the affected Hardware component after Reseller's or Customer's notification to Kuva of the product failure, to Reseller's or Customer's site as requested, at no charge (other than applicable shipping charges) unless

such failure is due to Reseller's or Customer's negligence or willful misconduct, lack of communication or power (in case of camera), or a force majeure event. If a replacement product or component of the Kuva Hardware is required, once the Kuva replacement hardware has been received, Kuva trained and certified personnel shall remove the affected hardware from the mounting structure and must ship it to Kuva using the replacement hardware packaging, within two (2) weeks. With respect to Kuva towers, Kuva may, in its reasonable discretion, require return of allegedly defective component(s) before shipping replacement component(s).
If the Kuva Hardware fails to function substantially in accordance with this Agreement after the expiration of the Warranty Period, Kuva will repair such Hardware, or, if necessary, send a replacement, for a fee, subject to Customer's prior approval. Customer is responsible for all shipping costs, inbound and outbound.

Software and platform warranty. Kuva represents and warrants to Customer that the Kuva Platform will be suitable for the purpose and use for which it is ordinarily employed and conform to any specifications or documentation set forth in this Agreement. Kuva will use commercially reasonable efforts to make the Kuva Platform accessible to Customers twenty-four (24) hours a day, seven (7) days a week. Kuva represents and warrants that to the extent Kuva personnel perform reviews of Customer data, such personnel will possess appropriate skill and qualifications to perform such reviews and will be bound by written confidentiality/non-disclosure provisions. The Platform may be inaccessible or inoperable for various reasons, including without limitation causes beyond the reasonable control of Kuva, including interruption or failure of telecommunication networks (which may include cellular networks or customer-owned networks) or third-party cloud services ("Downtime"). Kuva shall use commercially reasonable efforts to provide advance notice in the event of any scheduled Downtime.

Warranty disclaimer. SUBJECT TO THE FOREGOING WARRANTIES IN THIS SECTION, ALL COMPONENTS OF THE KUVA OFFERING ARE SOLD OR LICENSED AS IS AND KUVA HEREBY DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED, STATUTORY, OR ARISING BY CUSTOM, TRADE USAGE, OR COURSE OF DEALING, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEITHER THE KUVA OFFERING NOR ANY COMPONENTS THEREOF ARE DESIGNED TO BE, OR SHOULD BE USED AS, A GAS SAFETY SYSTEM. Kuva shall have no liability for, and Reseller and/or Customer are solely responsible for, installation of the Kuva Offering in compliance with all applicable laws. Kuva shall have no liability for malfunctions resulting from or caused by (a) alterations or modifications to the Kuva Offering by anyone other than Kuva; (b) misuse or neglect of the Kuva Offering by Reseller or Customer; (c) the combination or use of the Kuva Offering with hardware or software not supported by Kuva to the extent that the Kuva Offering is not a direct cause of the malfunction(s); or (d) the failure by a Customer to timely accept updates available from and provided by Kuva.

1.4 Warning & caution statements

Warning and caution symbols mean potential danger. A warning statement will be preceded by the ◆ symbol and means if the warning is not heeded, it can cause death or serious injury. A caution statement will be preceded by the ⚠ symbol and means if the precaution is not taken, it may cause minor or moderate injury.

◆WARNING

- The camera is only designed for installation in non-classified areas as per API 500/505
- Only trained and qualified personnel should install, replace or service this equipment.
- Installation must comply with all applicable local and national electrical codes.
- Disconnect power before servicing the equipment.
- Do not work on the system or connect/disconnect cables during periods of lightning activity.
- All mounting installations are subject to the acceptance of local jurisdiction.
- Do not locate the equipment near overhead power lines or other electrical light or power circuits, or in any location where the equipment can come in contact with such circuits. When installing the equipment, take extra precautions not to come into contact with such circuits, which may cause injury or death. For proper installation and grounding of the equipment, please refer to national and local electrical codes.
- There are pinch points and heavy lifting involved during system assembly and proper personal protective equipment is essential.
- The site is flat and close to level. The tower can tolerate up to 2 degrees of adjustment.
- The soil must have a minimum compression strength of 1000 PSF where the tower will be located.
- These guidelines are based on assumed soil conditions that may or may not exist in your area and on the assumption that no damage has occurred, and no modifications are made, to the tower or mounting device. A qualified structural engineer should be consulted prior to installing any tower or supporting device.

⚠CAUTION

- Power-over-Ethernet (PoE) certification does not apply nor extend to voltages outside of standard PoE ranges. Any PoE voltages outside of 0 – 60 Vdc have not been evaluated by UL or by Kuva Systems. The nominal PoE voltage for this equipment is passive 24 Vdc.
- The RJ45 Ethernet port on the equipment is not designed to be connected to a public telecommunication connection (PSTN) or any other connection other than power-over-Ethernet devices.
- Removal of any product labels on the equipment will render the product warranty null and void.
- Certain models contain an integrated, low-power, broadband light source that may cause damage to the eyes if observed directly at close range for extended periods of time.

1.5 Using the Web interface

Information about use of the Kuva web dashboard for camera control, monitoring and alerts can be found at www.kuvasystems.com/support.

1.6 Open-Source Software notice

This product includes certain open-source or other software originated from third parties that is subject to the GNU General Public License (GPL), GNU Library/Lesser General Public License (LGPL) and different and/or additional copyright licenses, disclaimers and notices.
The exact terms of GPL, LGPL, and some other licenses are provided to you with this product. Please refer to the exact terms of the GPL and LGPL at *http://www.fsf.org* (Free Software

Foundation) or *http://www.opensource.org* (Open Source Initiative) regarding your rights under said license. You may obtain a complete corresponding machine-readable copy of the source code of such software under the GPL or LGPL by sending your request to *info@kuvasystems.com* with the subject line “Source Code Request”.
This offer is valid for a period of three (3) years from the date of distribution of this product by Kuva Systems.

2 Description

Kuva enables oil and gas operators to detect and pinpoint methane and VOC emissions with a camera-to-cloud solution. This continuous monitoring solution consists of a proprietary shortwave infrared camera, an MS Azure Cloud solution that receives, stores and refines camera data, with a web portal and API for customers to stay on top of their emissions. The Kuva GCI360 continuous optical gas imaging (OGI) system is an industry leader in continuous emissions monitoring, with autonomous daylight operation and zero false positives. The multiband shortwave infrared (SWIR) sensor, ruggedized RGB optics and IP65 enclosure ensure visibility of customer infrastructure to monitor for intended or unintended emissions.

3 Supplied parts list

3.1 Kuva Camera

Description	QTY
Kuva GCI360 Camera	1
Wired anemometer with mounting bracket	1
CAT5/6 Ethernet cable assembly (50‘ with RJ45 connector)	1
Kuva Systems Power Box	1
Kuva Systems Power Box Installation Kit	1
(optional) external antenna	1

3.2 Kuva Tower (optional)

Base and guy wire kit

Description	QTY
Rohn Hinge Stub - Left	1
Rohn Hinge Stub - Center	1
Rohn Hinge Stub - Right	1
Guy Wire Turnbuckle Assembly - Mid	3
Guy Wire Turnbuckle Assembly - Top	3

Tower Top Mount Assembly	1
Guy Attachment Plate Assembly	1
Installed Camera Tower Base	1
Tower Hinged Coupling - Left	1
Tower Hinged Coupling - Center	1
Tower Hinged Coupling - Right	1
Mid Guy Wire	3
Upper Guy Wire	3
.56" ID Galvanized Steel U-Bolt	6
Clamping U-Bolt	1
3/8” Galvanized Washer	9
3/8” - 16 Grade 8 Carriage Bolt	3
3/8 - 16 Steel Thin Locknut	3
5-8 ES Steel Wide Hex Nut	9
5/8-11’ Grade 5 Hex Bolt, 7”	3
A325 Structural 5/8-11 Bolts, 5.5”	3
5-8 Hot Dip Galvanized Steel Washer	12
Ballast Clamp U-bolt	6
Headless Clevis Pin	3
G2 HDG Steel Hex Nut - 3/8-16	6
High Strength 3/8-16 Hex Bolt 3.5”	3
SS Hairpin Cotter	6
Welded Camera Top Mount	1
Tower Guy Attachment Plate	1
Kingpost Guy Anchor - Right	3
Kingpost Guy Anchor - Left	3
Upper Guy Anchor	6
Installed Camera Tower Leg	3
Threaded Coupling Block - Hole	2
Threaded Coupling Block - Slot	1
Tower Top Base Plate	1
Welded Kingpost Assembly	1
Ballast Clamp Bracket	3
Kingpost Star Plate ASSY	1
Tower Lower Tension Member	3
Tower Turnbuckle	6

Precast Adapter Kit

Description	**QTY**
5-8 ES Steel Wide Hex Nut	3
5-8 Hot Dip Galvanized Steel Washer	3
5/8-11 x 5” J-Bolt	3

Precast Brace Doubling Plate	3
Precast Ballast Top Brace	3
Precast Ballast Offset	6

Brick Ballast Kit

Description	**QTY**
5-8 Hot Dip Galvanized Steel Washer	6
5-8 ES Steel Wide Hex Nut	6
Ballast Carriage Bolt	6
Tower Ballast Strap	6
Tower Lower Ballast Rail	6
Ballast Top Brace	3

3.3 Utility Pole Mounting Kit (optional)

Description	**QTY**
Utility Pole adapter	1
Camera mount clamping U-bolt	1

3.4 Included tool kit

Description	**QTY**
Gin Pole Assy	1
Loos Gage PT-2	1
Kuva Tower Assembly Ratchet Straps	3
Site Layout Tool	1
.5” Bent-Pull Clevis Pin	2
1800 lb Self Braking Winch and Winch mounting extension	1

3.5 Installation tools & parts (not supplied)

Description	**QTY**
12” Pipe wrench (for Utility pole assembly only)	1
7/16" wrench or socket	1
1/2" wrench or socket	1
9/16" wrench or socket	1
5/8" wrench or socket	1
11/16" wrench or socket	1
12" Bubble Level	1
12” Large Adjustable Wrench	2
6" UV Zip Ties	25
Needle Nose pliers	1
3 mm Hex wrench (allen key will work)	1
1" Ratchet straps	3

Side cutters	1
Cable strippers	1
10 mm, 11 mm, 13 mm wrench	1
Multimeter/ Voltmeter	1
Small flat blade screwdriver for cable installation	1
Torque wrench 0- 500 INCH/LBS	1
Ballast blocks (required for Kuva Tower Assembly)	123
½-13 x 16” galvanized carriage bolt (optional utility pole assembly)	2
½” oversized washer (optional utility pole assembly)	2
1/2 – 13 Galvanized hex nut (optional utility pole assembly)	4
3” x 10’ rigid aluminum conduit (optional utility pole assembly)	1
40’ class 2 utility pole (optional utility pole assembly)	1

4 Unboxing & uncrating

Upon receipt of the equipment ensure all components are visibly free of physical damage. Inspect all parts and ensure all the material on the supplied parts list is included in the shipment. If any damage is found or any parts are missing, contact your Kuva Systems representative. +1 (617) 925-0480 Option 4.

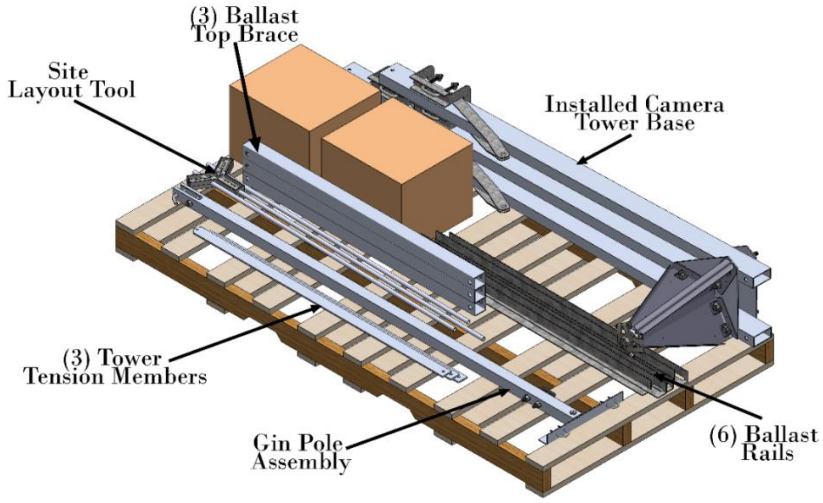


Figure 1 Kuva Tower Shipment packaging

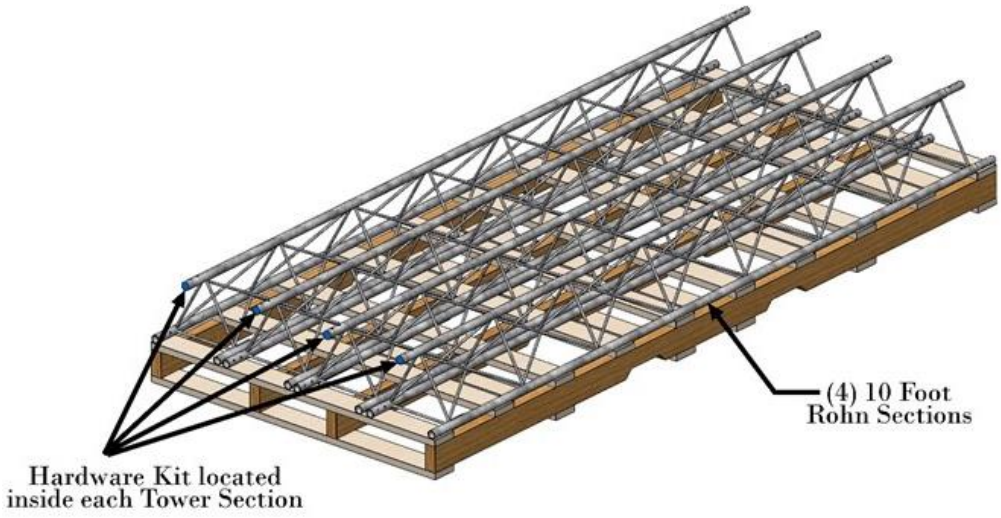


Figure 2 Kuva tower shipment Kuva Tower section packaging

1. On the 10’ Kuva Tower sections tower leg remove the blue caps at the end of the tower legs and then pull out all hardware kits as per Figure 2.

   ⚠ **CAUTION** Do not set the camera down onto the bottom end of the camera’s mounting post as per Figure 4. This will damage the RJ45 port that supplies power to the camera. When laying the camera down, only rest it on the back panel. Place it on a surface that won’t cause damage to the camera.

2. Remove the GCI360 Camera from the shipping box and place the camera on its backside on a clean, flat surface as per Figure 3.

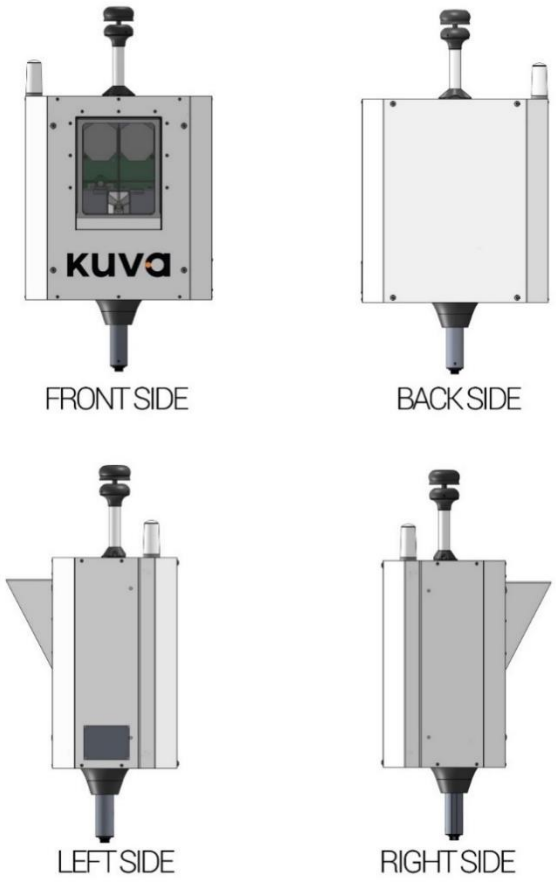


Figure 3 Kuva Camera CGI360 orientation

Figure 4 CGI360 Camera

5 Camera assembly

5.1 Anemometer mounting

1. Remove (2) M5 x 8 mm screws from the top of the Kuva Camera.
2. Attach the anemometer to the top of the camera. The alignment cylinder should face towards the front of the camera.
3. Ensure that the alignment cylinder at the bottom of the anemometer fits into the alignment cylinder receptacle on top of the camera enclosure as per Figure 5.
4. Reinstall the (2) M5 x 8 mm screws.

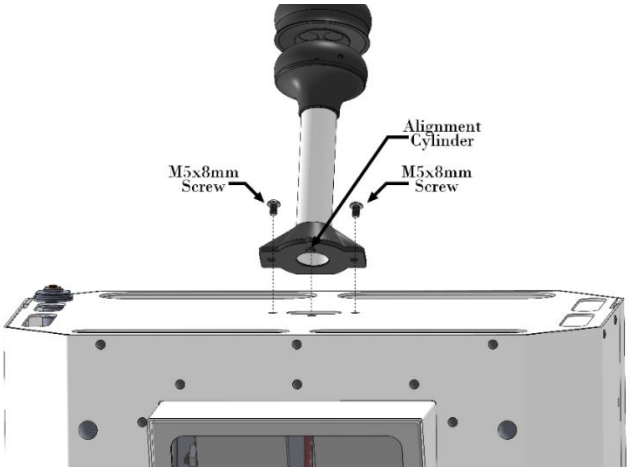


Figure 5 Mounting the anemometer

⚠ **CAUTION** Do not pick the camera up by the anemometer when moving the system
NOTE: Confirm that the alignment cylinder is facing towards the front of the camera

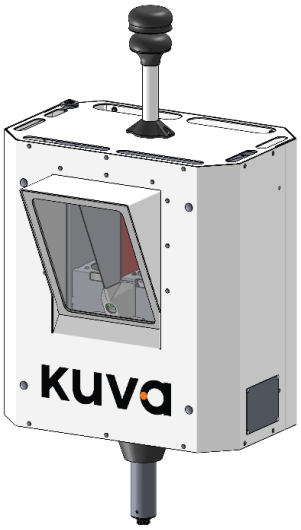


Figure 6 Camera assembly with anemometer

5.2 Antenna

For camera models with an antenna included refer to section 5.2.1 for mounting instructions. For Camera models without Antenna continue to section 5.2.2.

5.2.1 Antenna mounting

Note confirm antenna O-ring is properly seated in groove of antenna and is flush prior to connecting antenna to antenna panel mount connector as per Figure 7.

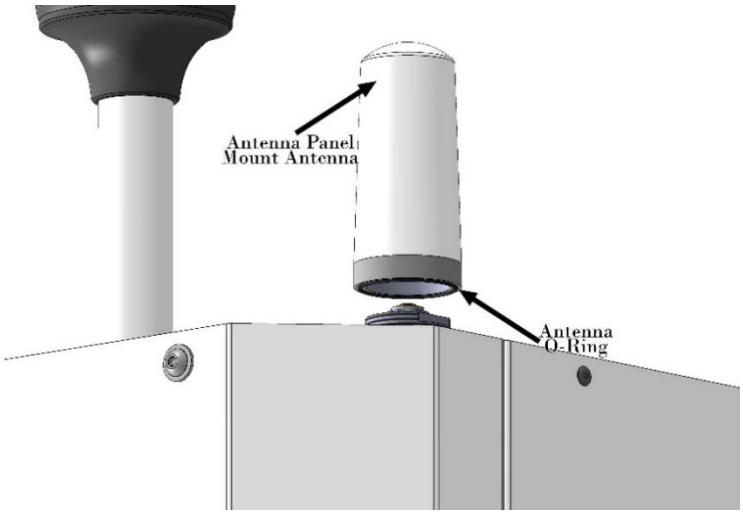


Figure 7 Seated antenna O-ring

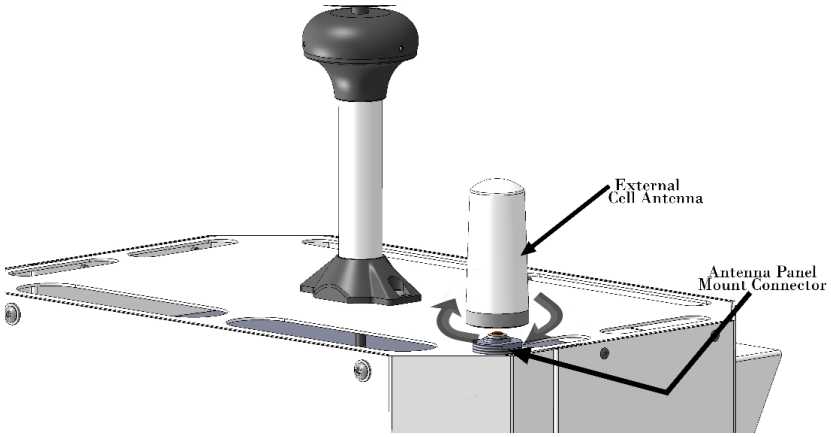


Figure 8 Antenna mounting

Thread the antenna clockwise onto the antenna panel mount connector post then hand tighten as per Figure 8. The O-ring must stay seated in groove during tightening.

5.2.2 Serial number and Camera location

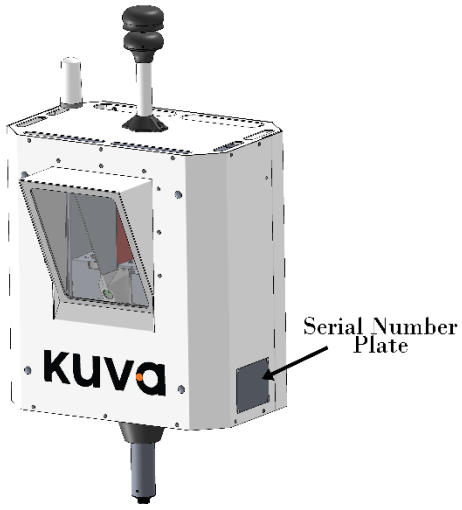


Figure 9 Camera with anemometer and antenna assembly

Take a picture of the serial number on the side of the Kuva Camera and copy GPS link location from within google maps or apple maps and send to the Kuva installation team via Kuva contact details from initial pre-installation meeting.

6 Mounting Kuva Camera to Kuva Tower or to a Utility Pole Attachment

If the GCI360 Camera is to be mounted to a Kuva Tower refer to Section 7 for assembly and camera attachment. If the GCI360 Camera is to be attached to a utility pole refer to Section 8 and then to the Utility Pole section 9.1.

◆**WARNING** for any other mounting configurations review with the Kuva engineering department.

7 Kuva Tower assembly (optional)

If the GCI360 Camera is to be mounted to a Kuva Tower refer to this section otherwise refer to the utility pole mounting section 9.1.

7.1 Tower setup

Select an installation site that meets the following criteria:

1. There are no overhead or adjacent power lines or obstructions that the tower will come in contact with during assembly and raising the tower.

2. The site is flat and close to level. The tower can tolerate up to 2 degrees of adjustment.
3. The soil has a minimum compression strength of 1000 PSF where the tower will be located. (Seek Engineering consultation if it is not clear this condition is met)
4. It has an area 16 ft wide x 50 ft long to accommodate the tower base and tower laid horizontally prior to raising.
5. Review the range from the tower location to equipment that is to be monitored. (Kuva recommended placement)

◆**WARNING** confirm there are no overhead power lines or obstructions that the tower will come into contact during lifting or assembling prior to locating the ballast blocks.

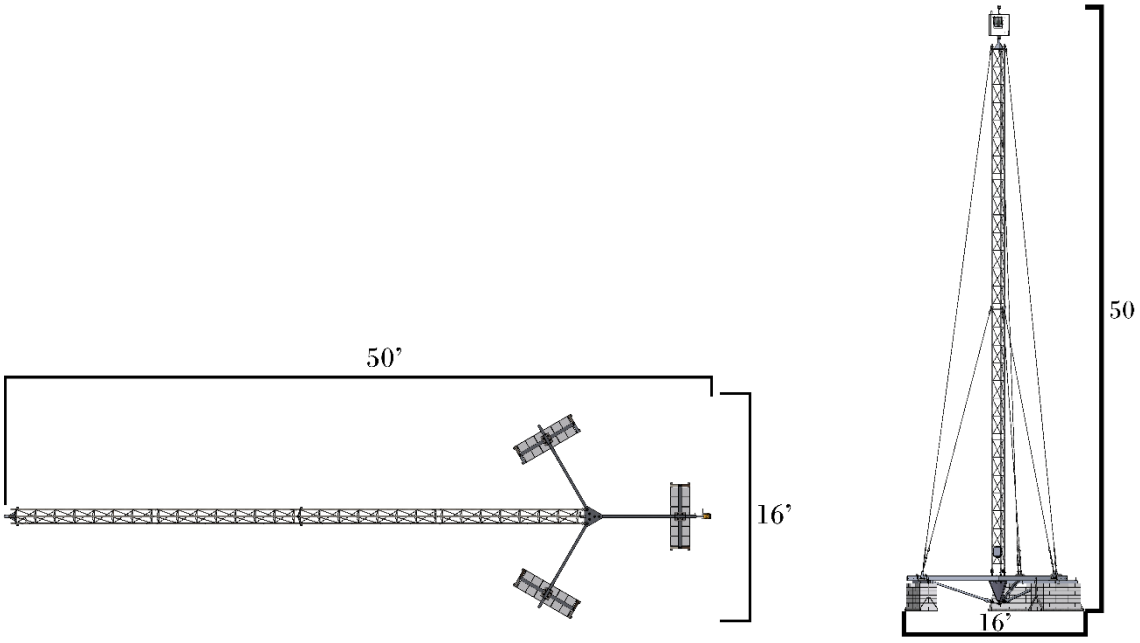


Figure 10 Site installation requirements

7.2 Locate and assemble the ballast blocks

1. Locate a tower Lower Ballast Rail and align the 2 tower ballast straps to the ends of each end of the lower ballast rail. Center both tower ballast straps within the slots cut out of the tower lower ballast rail as per Figure 11.

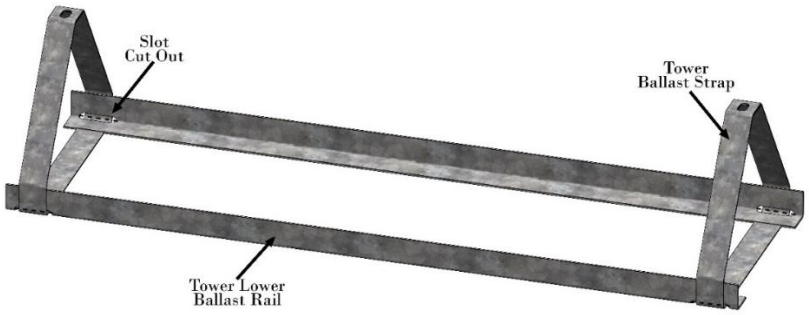


Figure 11 Tower ballast strap assembly

2. Assemble 3 tower ballast strap assemblies.
3. Slide the threaded end of the ballast carriage bolt into the tower ballast straps top hole and let it rest on bottom of the tower ballast strap as per Figure 12 and Figure 13.

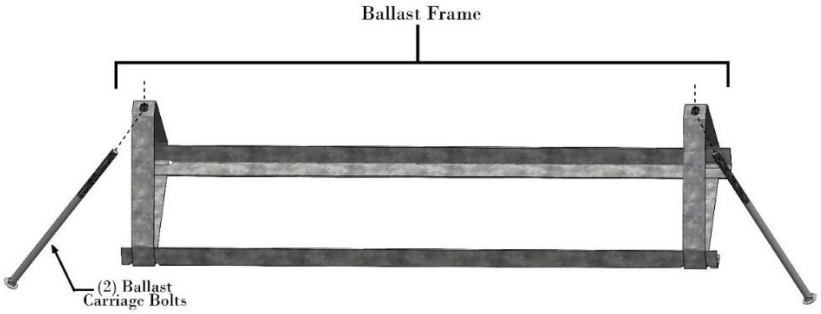


Figure 12 Ballast carriage bolt insertion

Figure 13 Ballast frame assembly

4. Use the provided site layout tool to determine where the base of the tower and ballast blocks will be located.
5. Place the site layout tool at the center of where the tower will be located.
6. Place the tower ballast frame assembly perpendicular to the site layout tool as per Figure 14 and confirm there is an area for the tower to be assembled and connected with no obstructions as per Figure 15.

Note: The tower folds down opposite one leg of the layout tool. The raising winch will be mounted on the leg opposite the tower.

Note: When locating the ballast blocks confirm there is an area 14 ft wide x 50 ft long. Follow installation guidelines in section 7.1

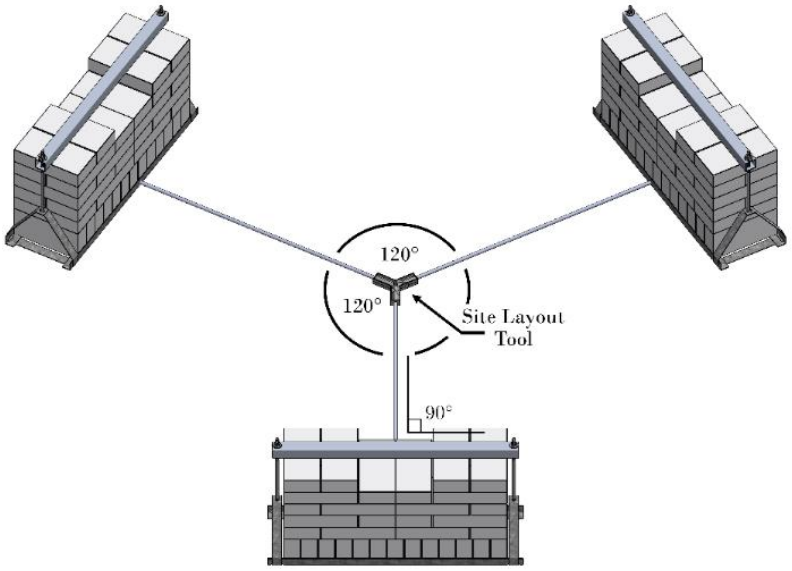


Figure 14 Site layout tool

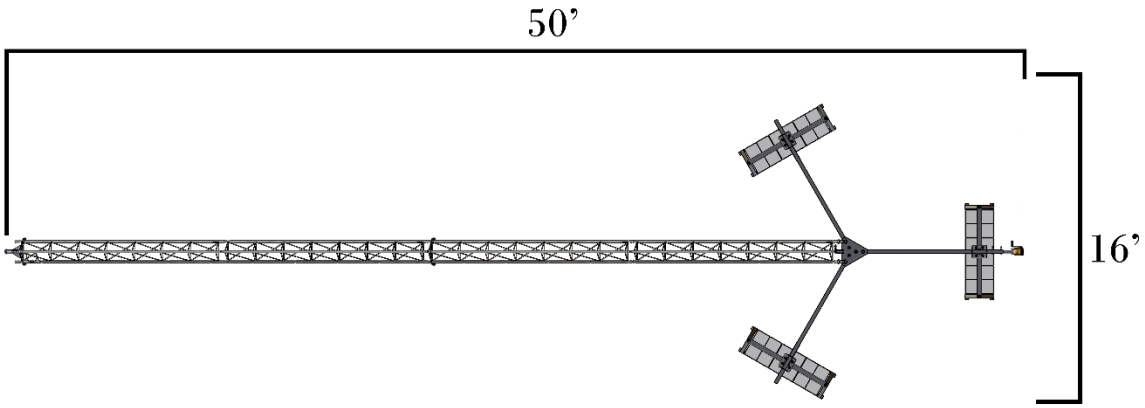


Figure 15 Ballast Block location

7. Install the ballast bricks into the ballast frame. On the first row lay the bricks on their side as shown as per Figure 16.

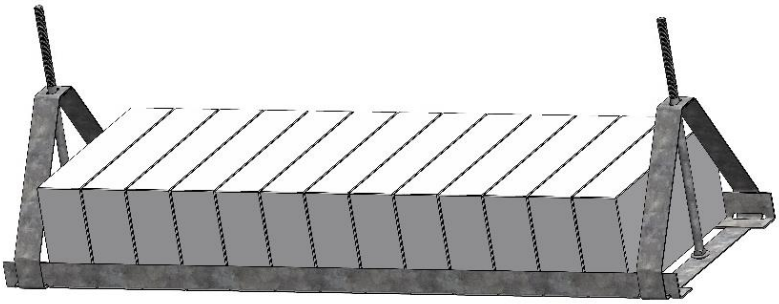


Figure 16 Ballast brick layout

8. Install the ballast bricks to the ballast frame alternating brick layout as per Figure 17.

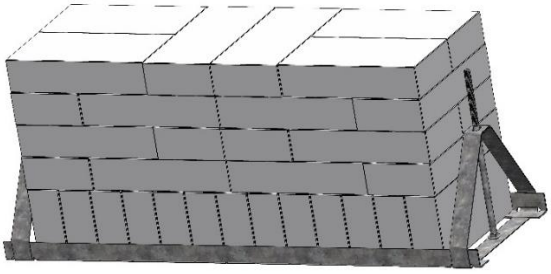


Figure 17 Alternating ballast brick pattern

9. Install the ballast bricks to the top row as per Figure 18.

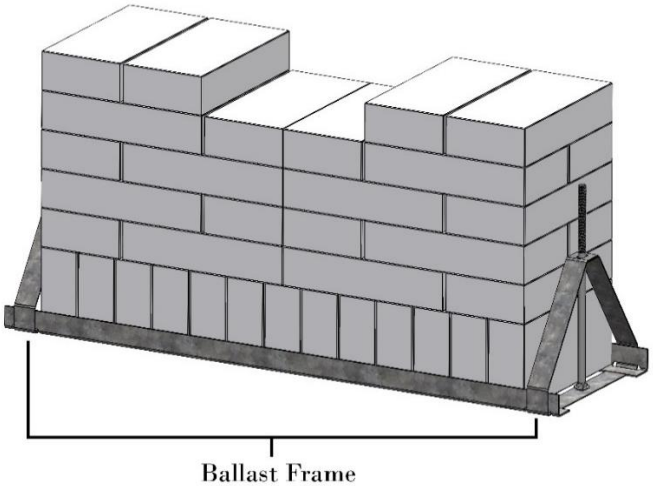


Figure 18 Ballast frame assembly

10. Lift the ballast carriage bolts and install the tower ballast top brace to the ballast carriage bolts using (2) 5/8” washers & (2) 5/8” nuts tightening the nuts.

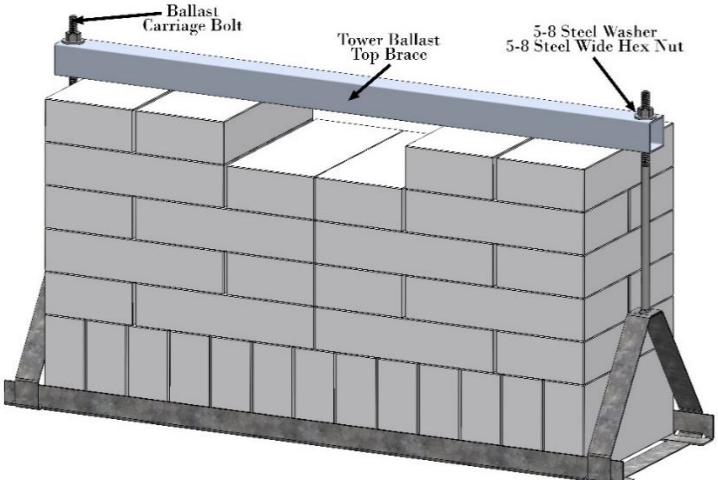


Figure 19 Ballast frame assembly

11. Repeat for the other 2 ballast frames as per Figure 20.

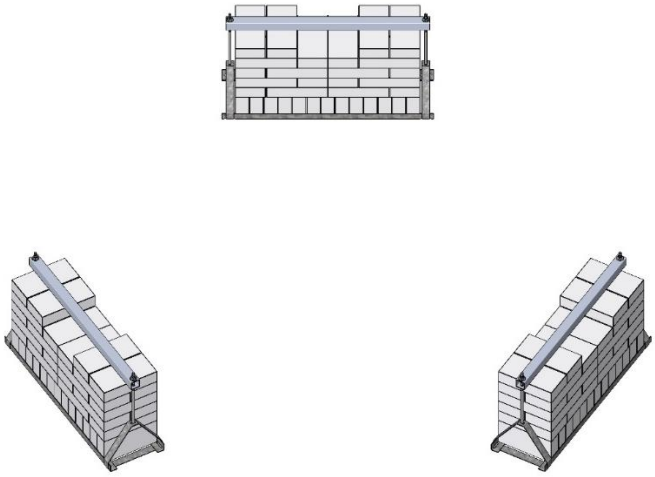


Figure 20 Ballast frame area layout

7.3 Prepare the Tower Base

1. Open 2 of the tower legs by removing the (2) 5-1/2” bolts as per Figure 21. Once fully opened, line up with the holes and reinstall the bolts to secure the tower legs.

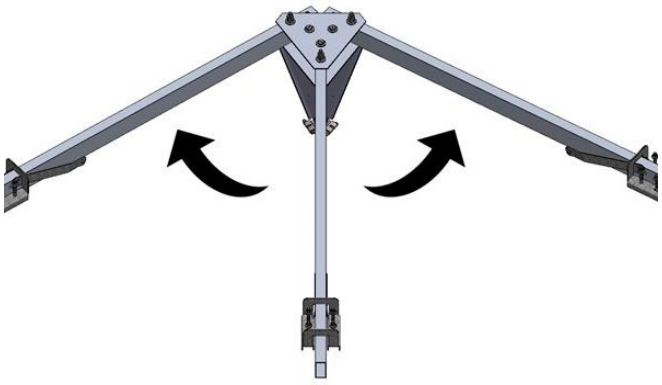


Figure 21 Extend tower base

Note: Leave 5-1/2” bolts temporarily loose.

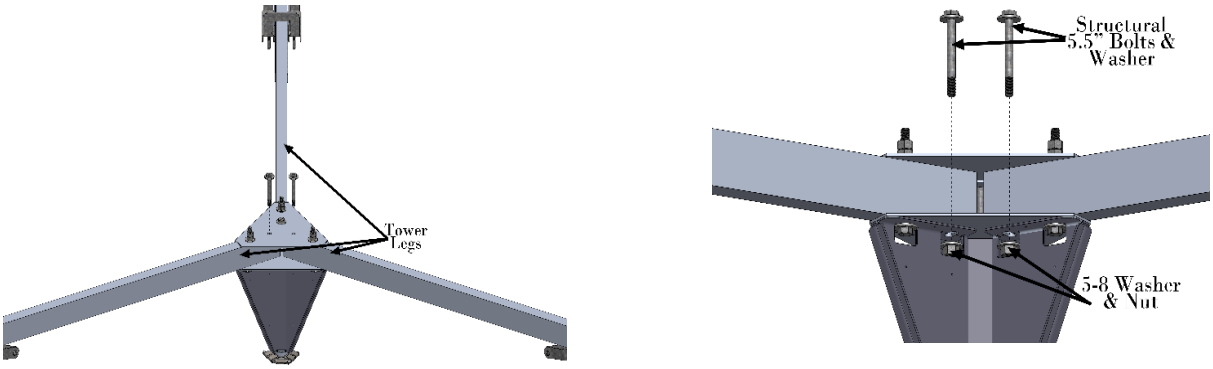


Figure 22 Tower base extension

2. Rest the tower base on top of the ballast frames at the center of each ballast frame as per Figure 23.

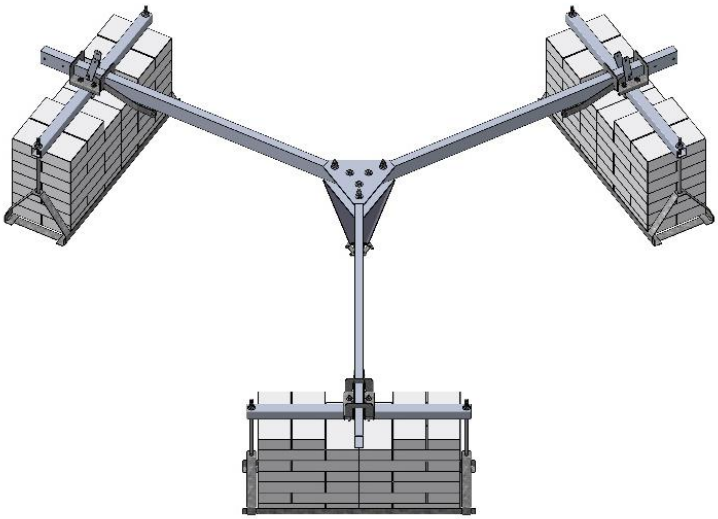


Figure 23 Tower base installation

3. Secure the (3) tension members to the bottom of the Starplate assembly using (3) 3-1/2” bolts and (6) hex nuts as per Figure 24 and Figure 25 .

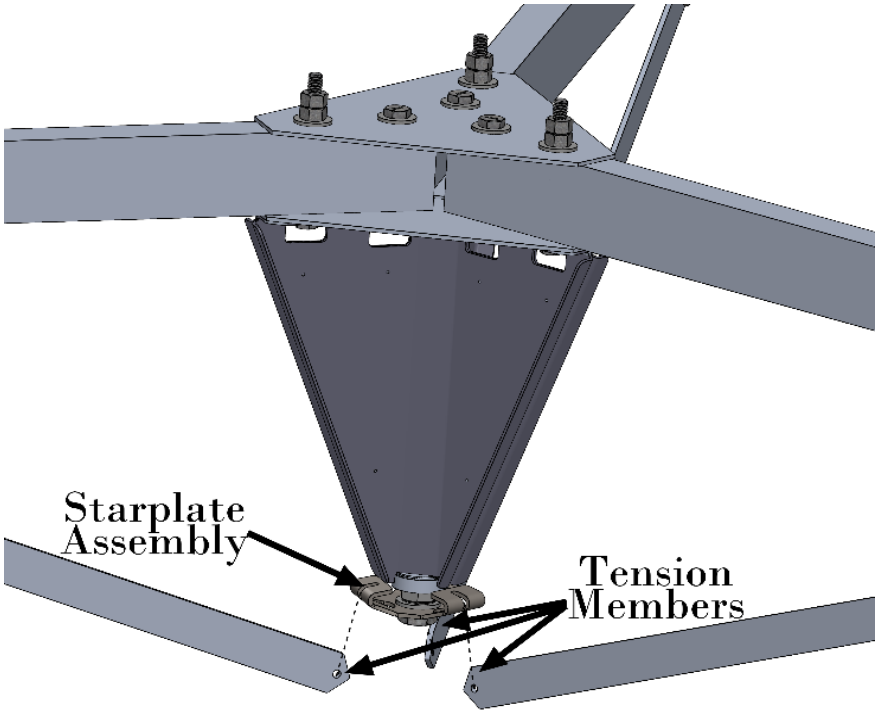


Figure 24 Tension member star plate assembly

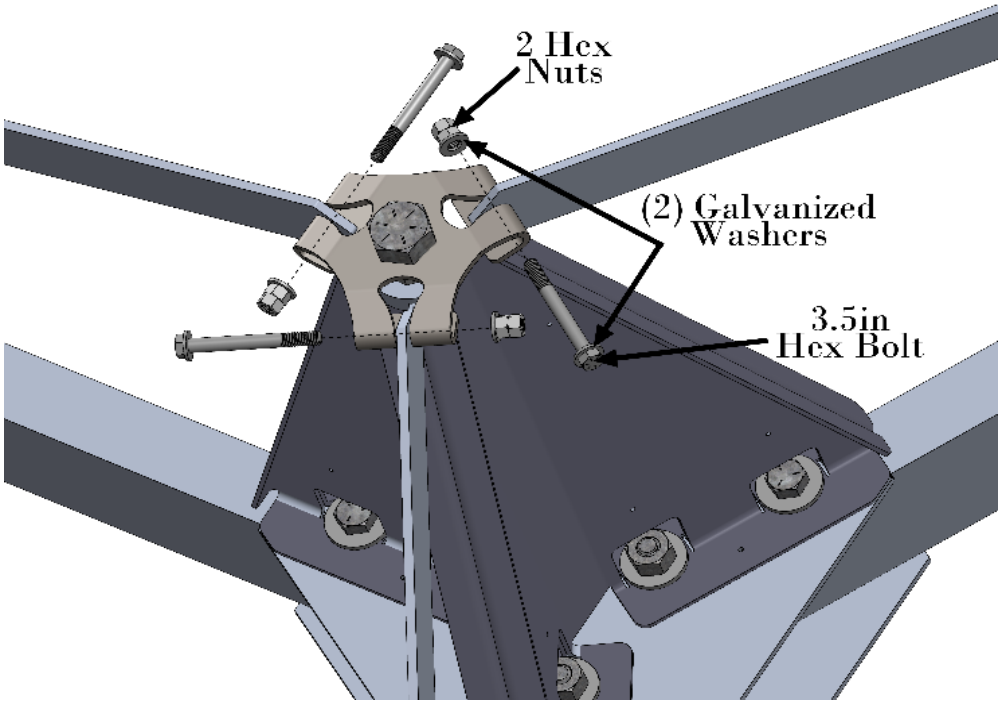


Figure 25 Tension Member assembly

4. Remove the locknuts from the carriage bolts on the 3 kingpost guy anchors. Install the other end of the previous tension members onto all 3 kingpost guy anchors.

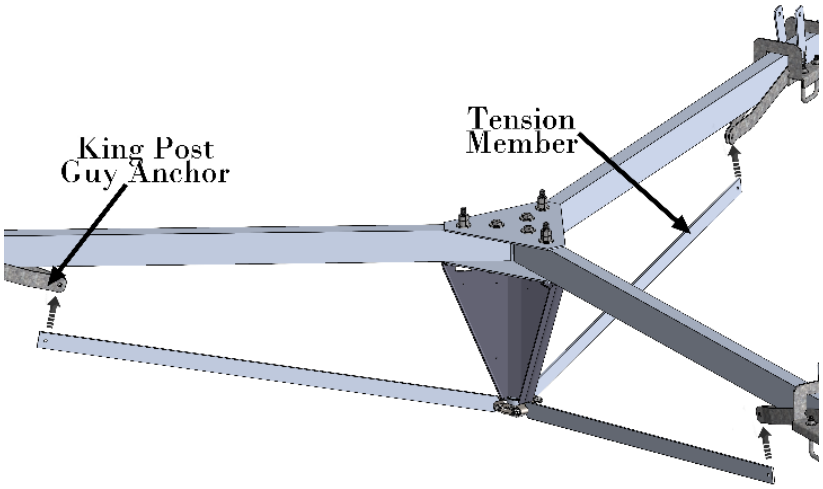


Figure 26 King post guy anchor tension member assembly

5. Tighten all 6 structural 5-1/2” bolts on the tower base center as per Figure 22.
6. Center the Tower Base onto ballast blocks. Secure with ballast clamp U-bolts to the top ballast braces. Start with all U-bolts loose and move the Tower Base until it is evenly positioned on the ballasts.
7. Once the tower base is evenly positioned tighten all U-bolts.

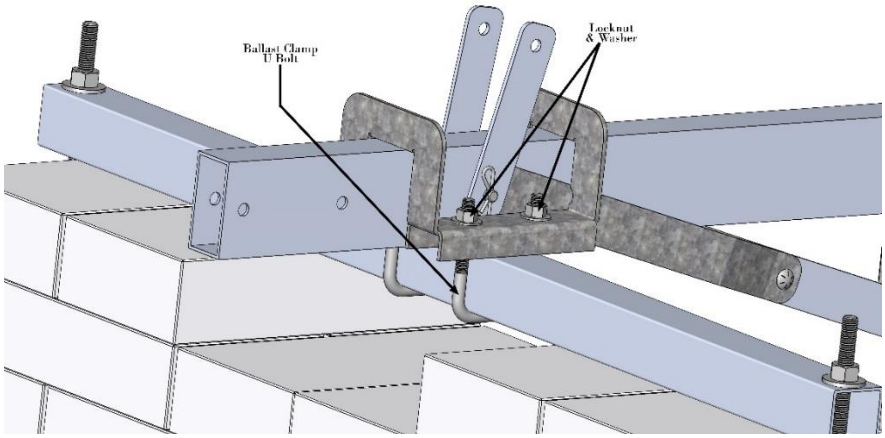


Figure 27 Ballast clamp U-bolt

8. Tighten the tension members using the kingpost hex bolt secured to the Starplate under the Tower Base. Use a 1-1/2” wrench to turn the kingpost hex bolt turning **clockwise when viewed from above**.

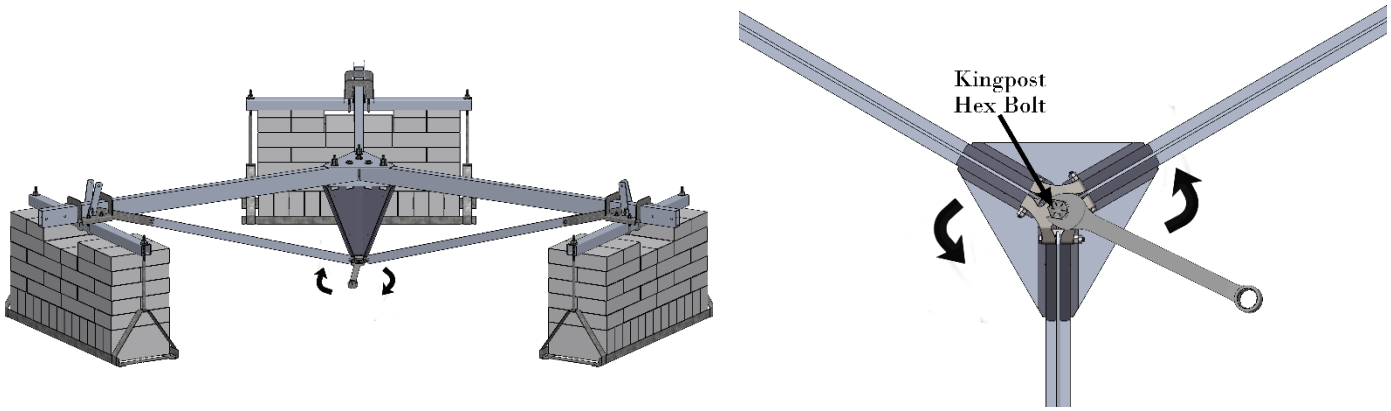


Figure 28 Tightening tension members

9. Tighten the tension members until all slack is removed.
10. Measure the height from the ground to the top of the baseplate and tighten kingpost hex bolt to increase the height an additional ½" from the ground as per Figure 29.

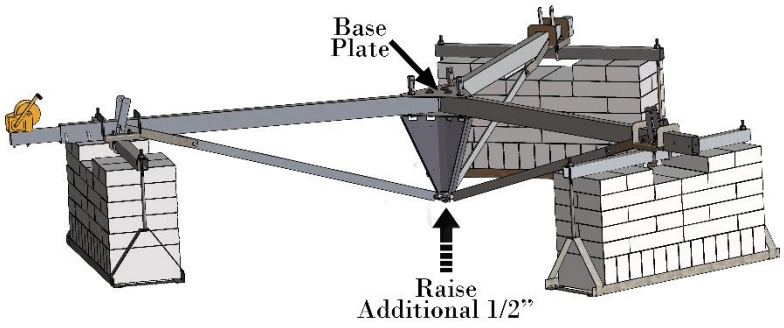


Figure 29 Base setup

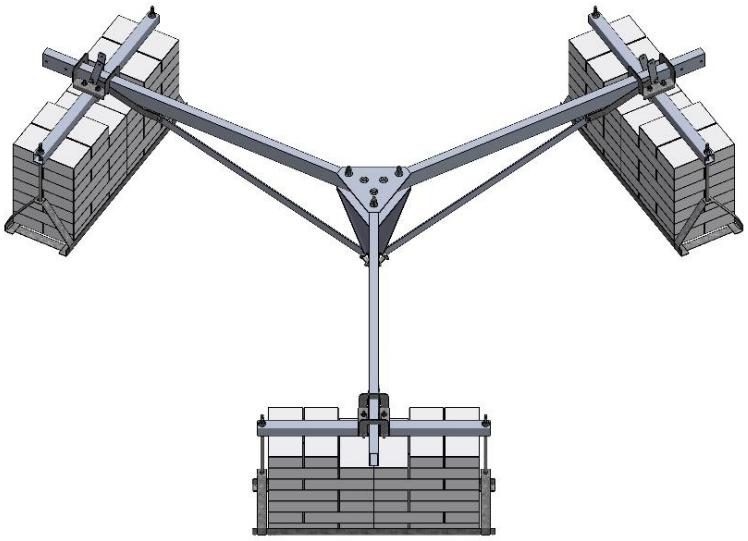


Figure 30 Tower base with Tension members

7.4 Installing and leveling the threaded blocks

NOTE: There are different versions of the **threaded coupling blocks** as per Figure 31. The threaded blocks are either a hole version or a slotted version. The hole version is used on the two points that form the hinge to raise the tower. The slotted version is on the same leg as the lifting line / winch.

1. Install the threaded coupling blocks until there is no more travel.

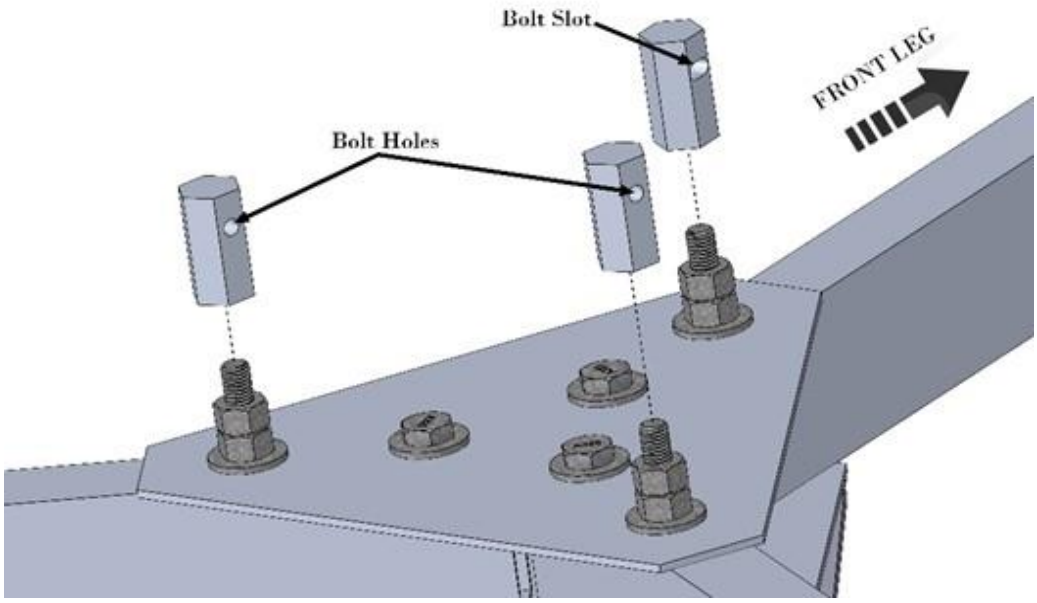


Figure 31 Installing the threaded coupling blocks

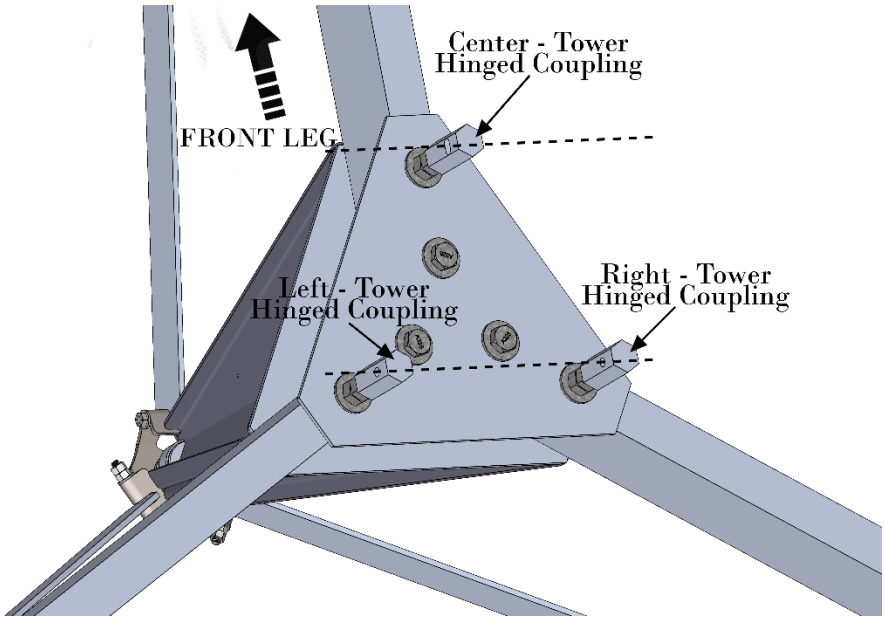


Figure 32 Threaded coupling block orientation

2. Place a level on the threaded blocks and move them up and down to level all three blocks.

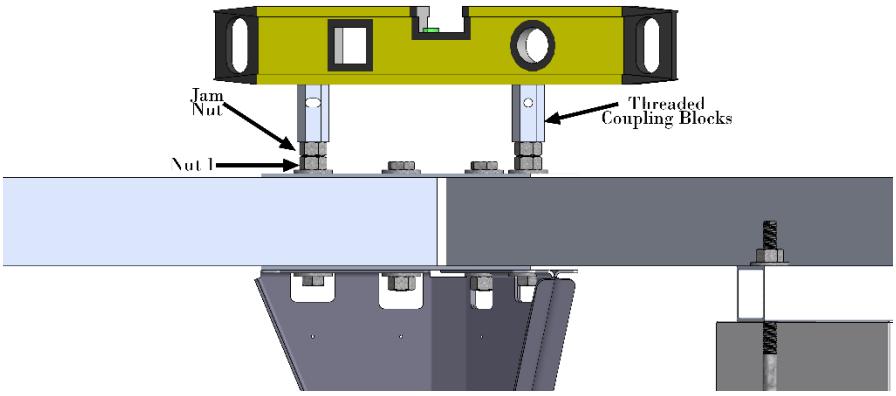


Figure 33 levelling the threaded coupling blocks

3. Once threaded blocks are level, loosen the Jam nuts, turning each counterclockwise, until tight against the bottom of each threaded coupling block as per Figure 33.
4. Ensure the holes line up to form a hinge axis and parallel to the slot in the front threaded block

7.5 Connect the Kuva Tower sections

NOTE: each tower section is identical. The tower sections can be assembled on the ground, with the help of 3 ratchet straps and using the included hardware. Confirm the hardware kit located in one leg (blue capsule) of each tower section has been removed prior to tower section installation. See Figure 2

1. Install any two 10’ Kuva Tower sections together to form one 20’ Tower section as per Figure 34.
2. Secure the (3) tower legs sections using (3) 7/16” head bolt and (3) 1/2” Nuts. Then secure using (3) 1/2” head bolt and (3) 9/16” nuts as per Figure 35.
3. Duplicate for the other two tower sections to make a second 20’ section.

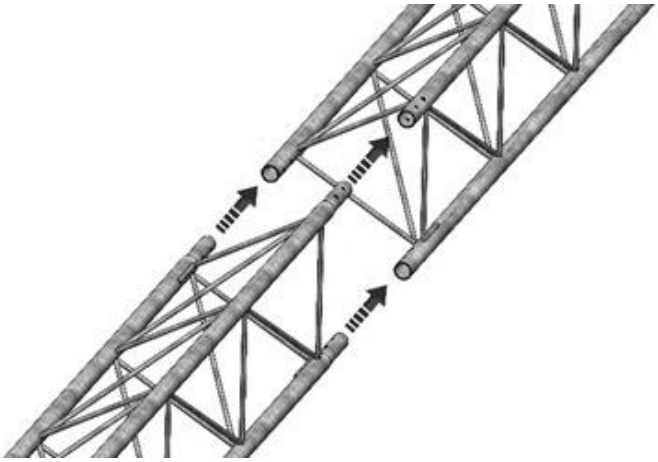


Figure 34 2 x 10’ Rohn section assembly

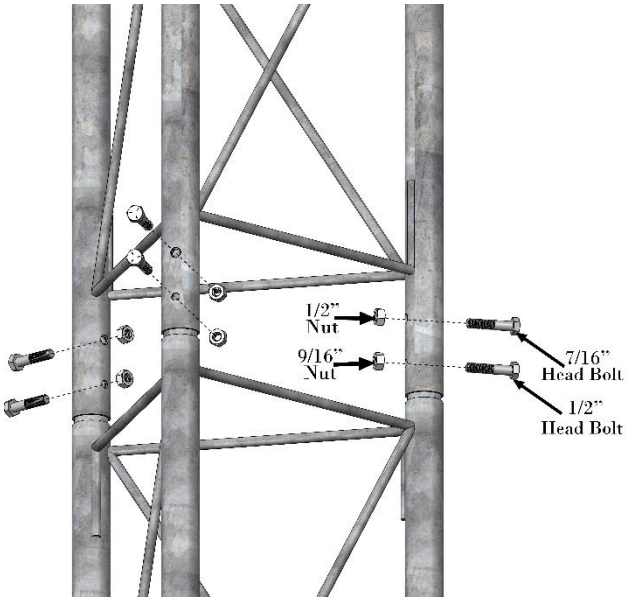


Figure 35 2 x 10’ Tower section bolt assembly

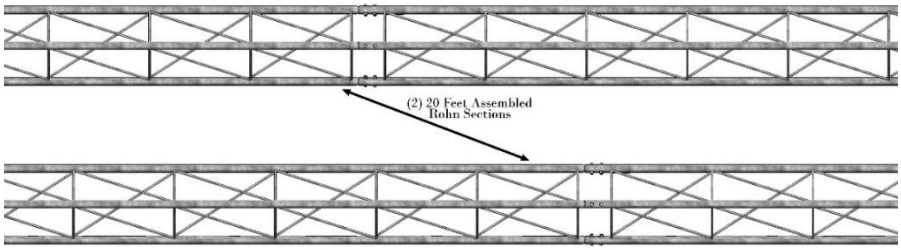


Figure 36 Fully assembled tower sections

4. Install the Tower Guy Attachment Plate onto the end of the first 20’ tower section and the Camera Top Mount plate onto the end of the second 20’ Kuva Tower section as per Figure 37.

Note Ensure the flanges on each plate face downwards into the Kuva Tower section.

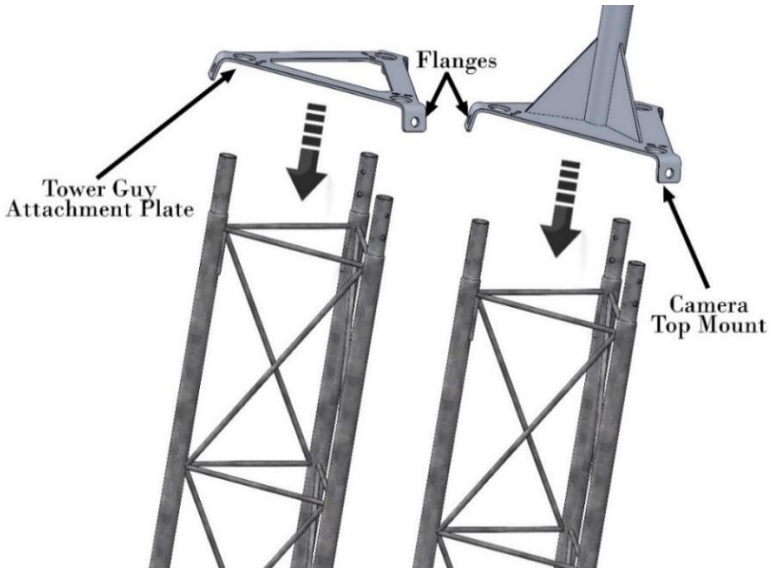


Figure 37 Tower Guy plate attachemnt plate / camera top mount plate assembly

5. Use the supplied ¼” U-bolts, ¼” washers and ¼” nuts to attach plates.

Note Ensure the U-bolts are around the strapping as per Figure 38 & Figure 39.

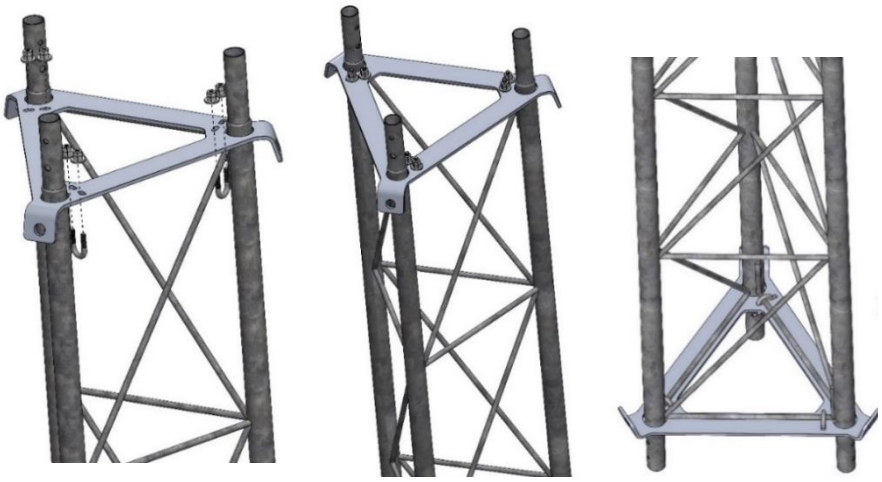


Figure 38 Tower guy attachment plate assembly

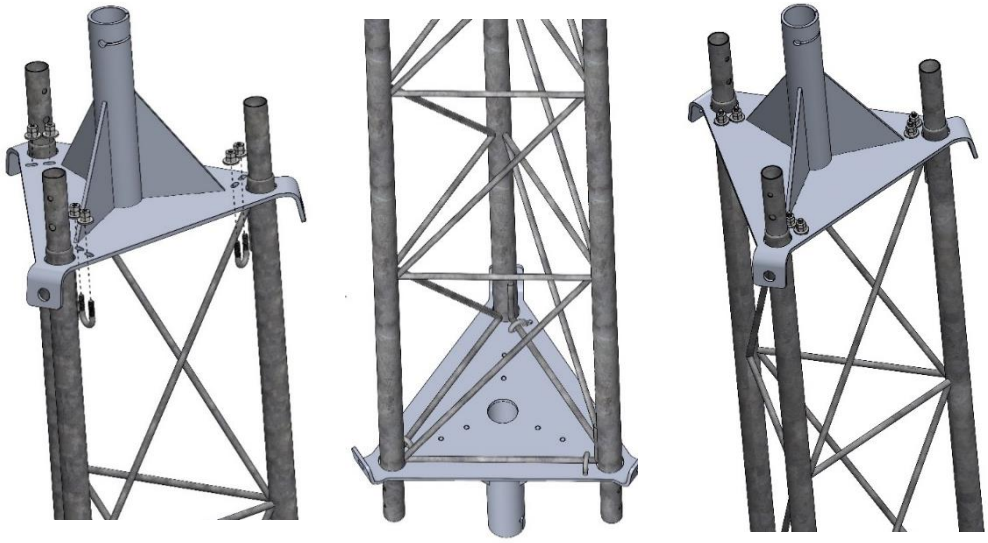


Figure 39 Camera top mount plate assembly

6. Connect the (2) 20’ Kuva Tower sections to one another with the Tower Guy Attachment Plate in between both sections using included rachet straps as per Figure 40.

7. Secure the (3) tower legs sections using (3) 7/16” head bolt and (3) 1/2” Nuts. Then secure using (3) 1/2” head bolt and (3) 9/16” nuts as per Figure 41.

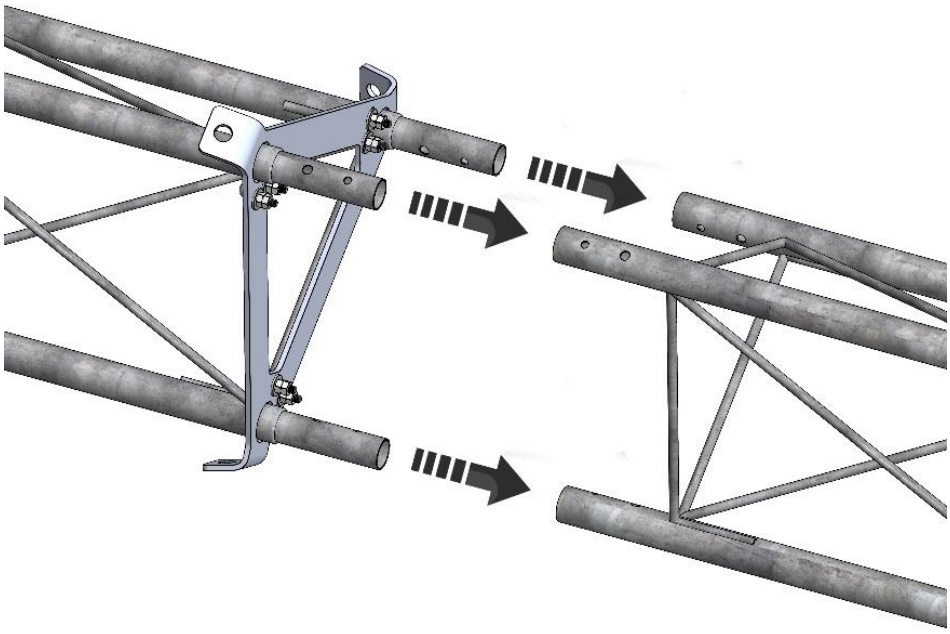


Figure 40 40’ Kuva Tower assembly

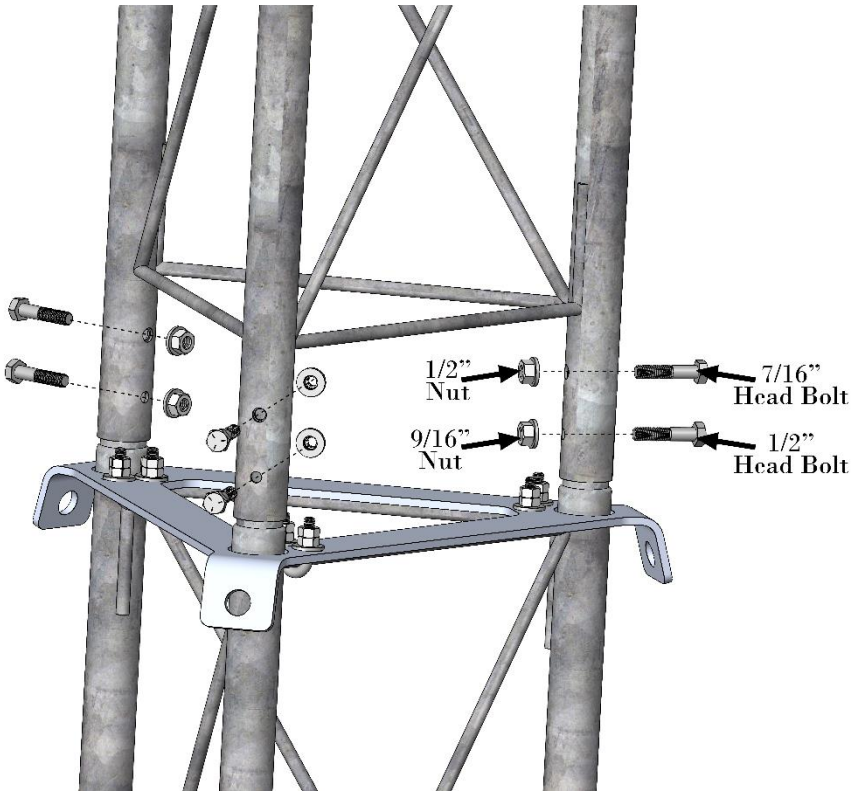


Figure 41 40’ Kuva Tower bolt locations

7.6 Rohn hinge attachment

NOTE: There are specific Rohn hinge stubs for each leg of the tower. The bolt holes aim towards the center of the tower section and the stub fits into the leg that keeps all the side plates parallel as per Figure 42.

1. Insert the Rohn hinges into the 3 legs of the 40’ Kuva Tower section.

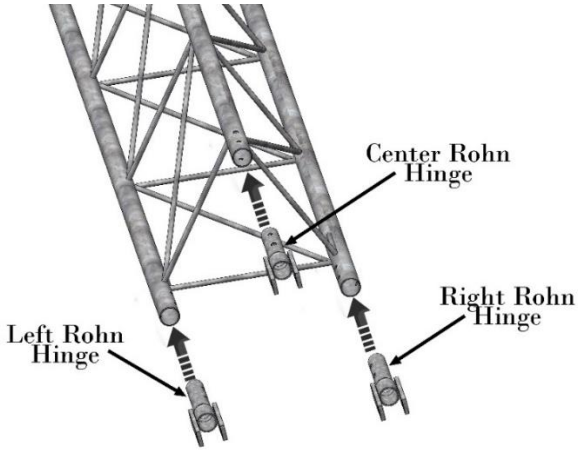


Figure 42 Rohn hinge assembly

2. Secure the (3) Rohn hinges to the bottom of the 40’ Kuva Tower using (3) 7/16” head bolts, and (3) nuts. Then secure using (3) ½” bolts, and (3) nuts as per Figure 43. Orient each Rohn hinge so they match Figure 44.

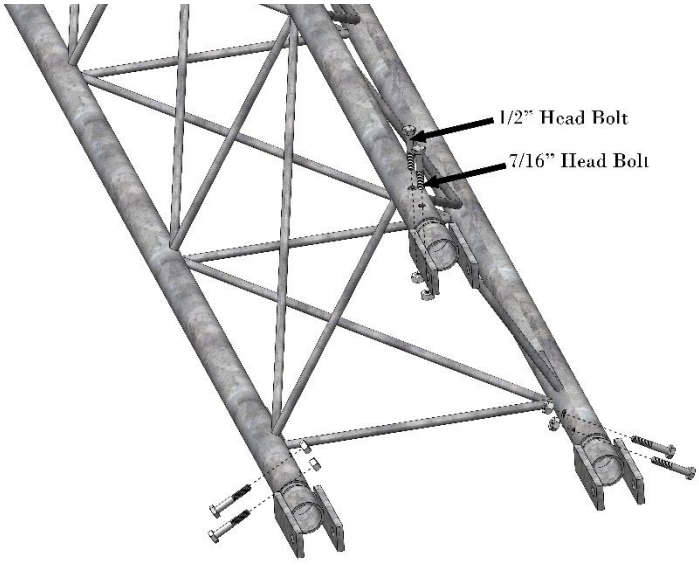


Figure 43 Rohn hinge assembly

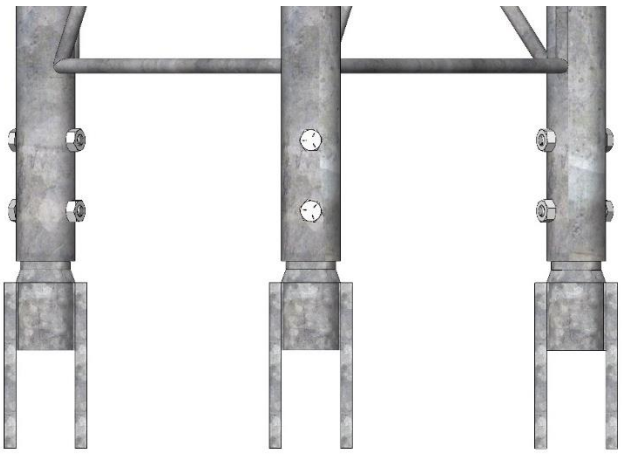


Figure 44 Assembled Rohn hinges

3. Install the complete 40’ Kuva Tower section with Rohn hinges into the threaded coupling blocks on the Tower Base. Only secure Left and Right Rohn hinge’s first.

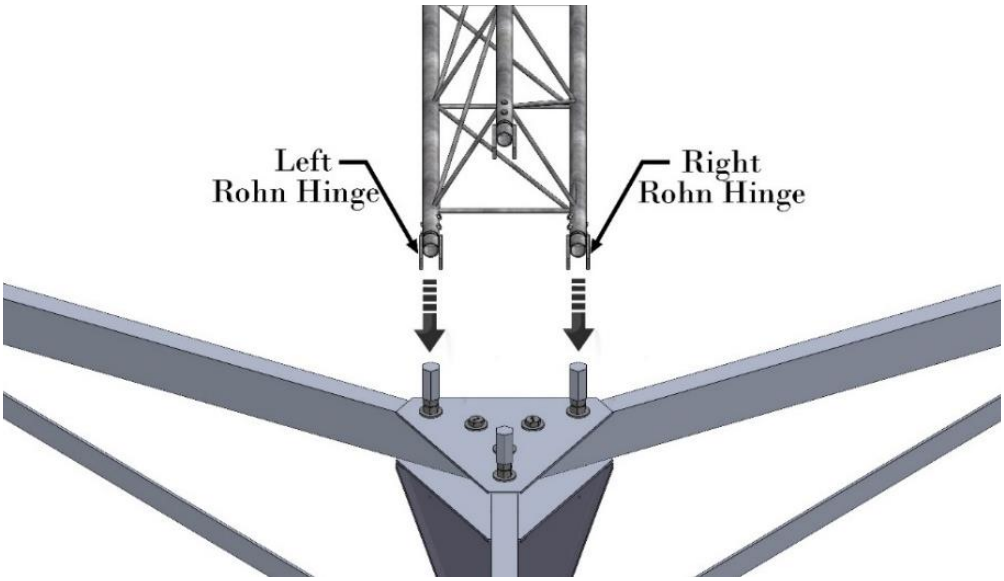


Figure 45 Kuva Tower to base assembly

4. Secure the (2) Rohn hinges to the coupling blocks with (2) 5/8” Head bolts, (2) 11/16” nuts and washers.

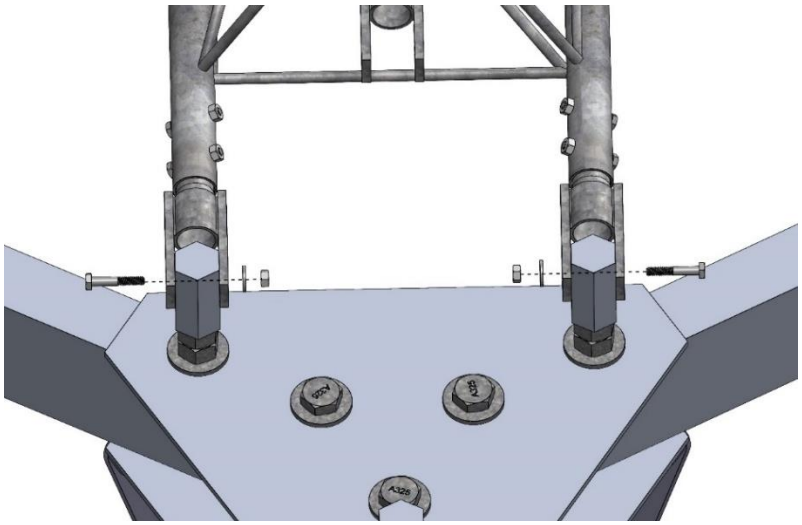


Figure 46 Kuva Tower to base assembly

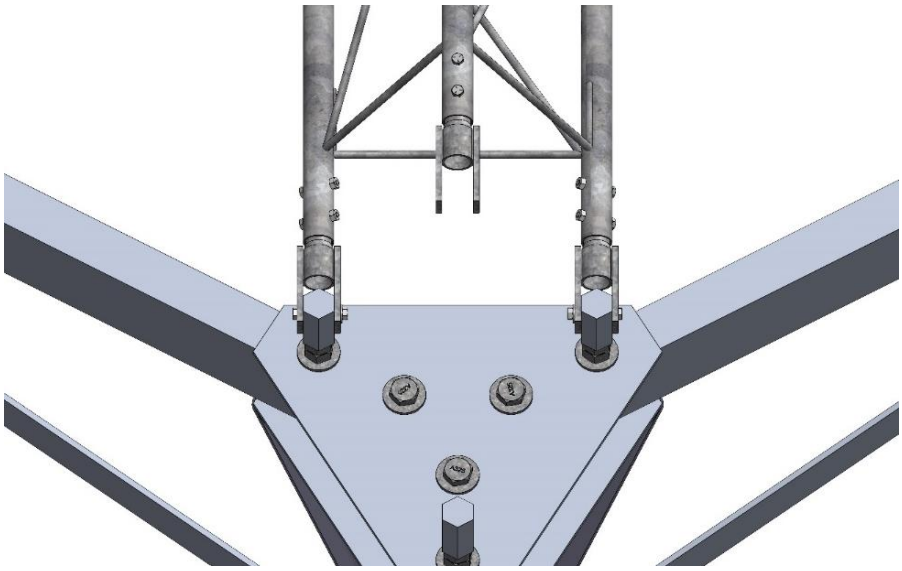


Figure 47 Kuva Tower to base assembly

7.7 Attach the guy wires & turnbuckles

1. Loosen all the quick links attached to guy wires.
2. Insert the quick links onto the flanges of the guy attachment plate and camera top mount plate as per Figure 48.

Figure 48 Quick link orientation

3. Attach the shorter guy wires to the tower guy attachment plate as per Figure 49. Attach the longer guy wires to the camera top mount plate as per Figure 50.

Figure 49 Tower guy wire attachment

Figure 50 Camera top mount guy wire attachment

4. Tighten all quick links.
5. Loosen all the turnbuckles evenly until 1” is remaining in each turnbuckle.
6. Arrange all the turnbuckles so they will tighten when turned clockwise with left hand thread at the top as per Figure 51.
7. Attach all (6) turnbuckles to the upper guy anchors.
8. Attach (4) guy wires to the turnbuckles furthest away from the winch.
9. Tighten only after the tower is raised.

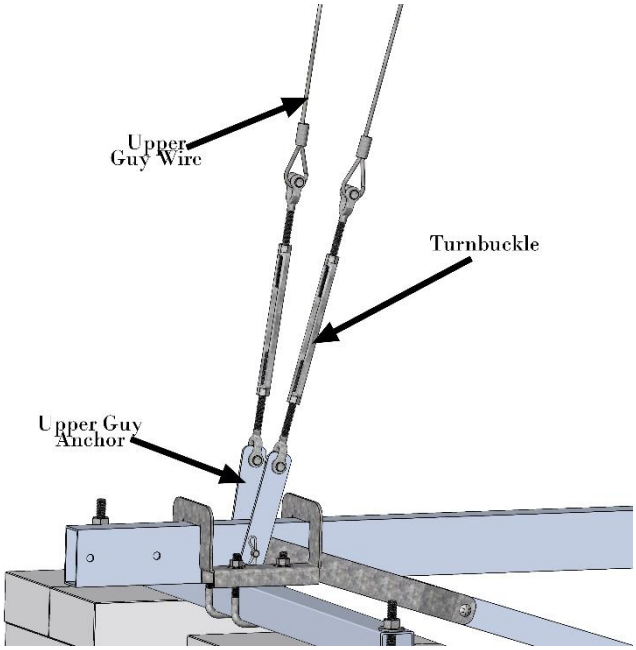


Figure 51 Turnbuckle connection

7.8 Attach the lifting Line

1. Install the winch extension piece into the front tower leg using (2) 5” clevis pins and cotter pins as per Figure 52 and Figure 53.

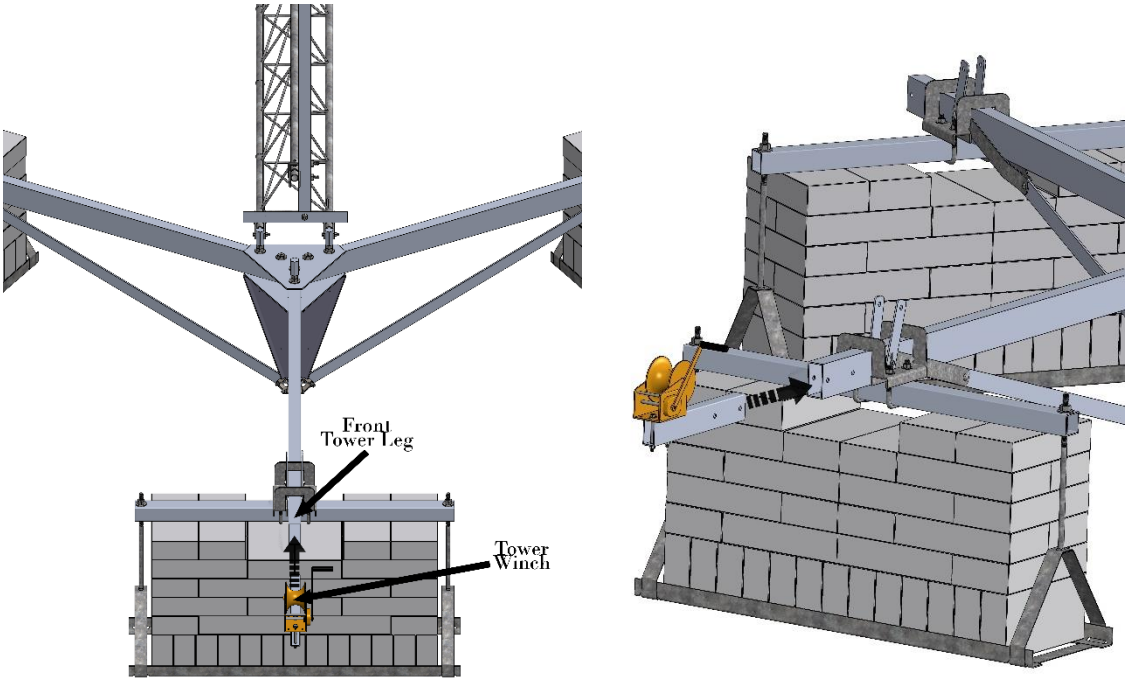


Figure 52 Inserting winch extension

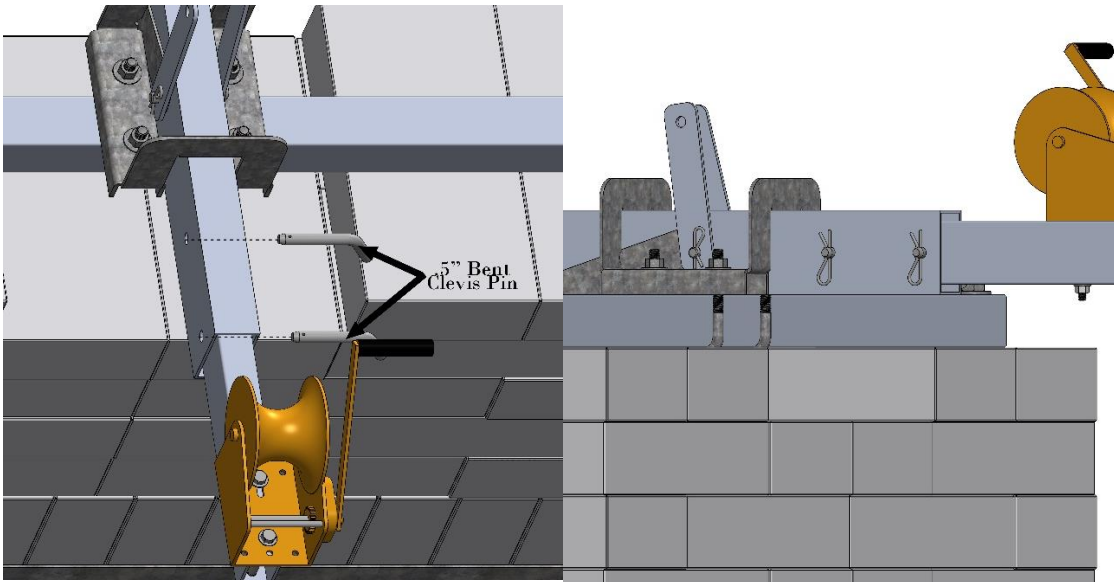


Figure 53 Winch extension attachment

2. Unravel the lift line from the winch so there is enough slack to mount over the gin pole bolt Figure 54.

◆WARNING confirm gin pole angle iron bolt connection is tight as per Figure 54.

Figure 54 Gin pole

3. On the gin pole remove the cotter pin and the gin pole clevis pin and feed the lift line from the winch to the top of the gin pole bolt then replace the gin pole clevis pin and re-insert the cotter pin onto the gin pole clevis pin as per Figure 55.

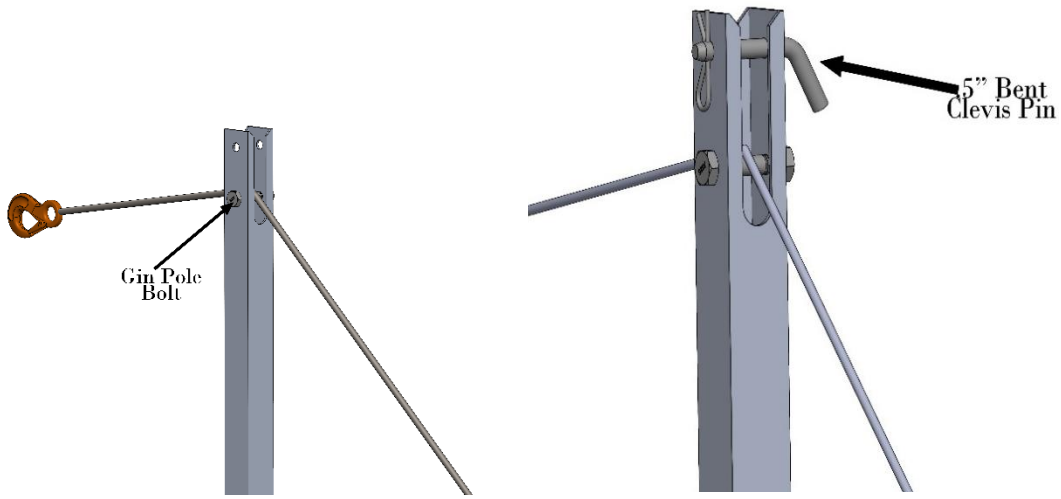


Figure 55 Gin pole bolt and clevis pin

7.9 Attach the gin pole to the Kuva Tower assembly

◆**WARNING** Attach the gin pole so it is below the bottom bolts of the Kuva Tower and above the hinged coupler as per
Figure 56. The 1-1/2" U-bolt must locate in the grooved area. Failure to do this can cause the tower section to fail when lifting.

4. Mount the gin pole to the 40' Kuva Tower with provided 1- ½" U-bolts and square U-bolt.

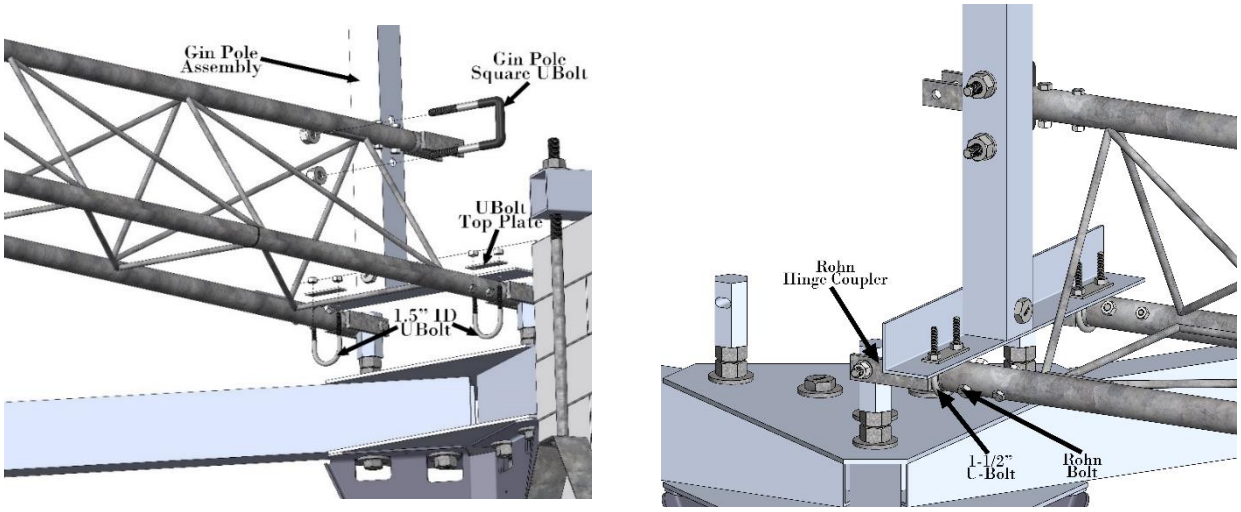


Figure 56 Mounting the gin Pole assembly

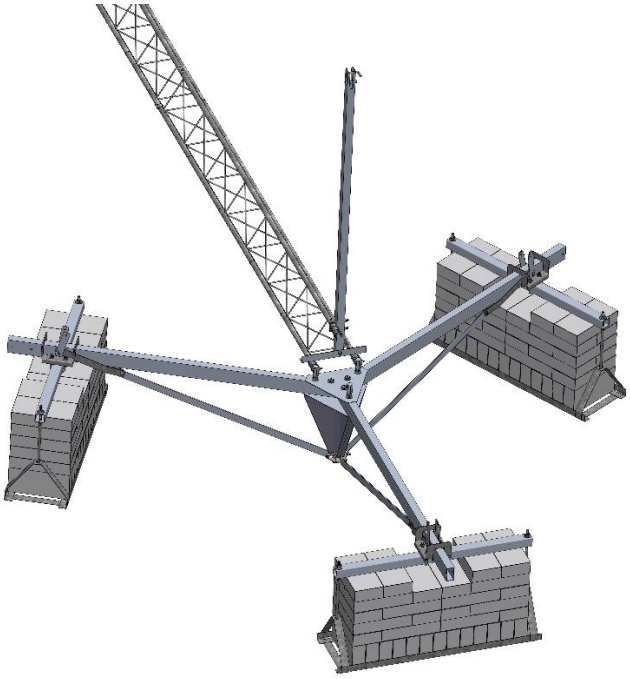


Figure 57 Gin pole assembly

10. Connect the upper guy wire eyelet to the lifting line hook as per Figure 58.

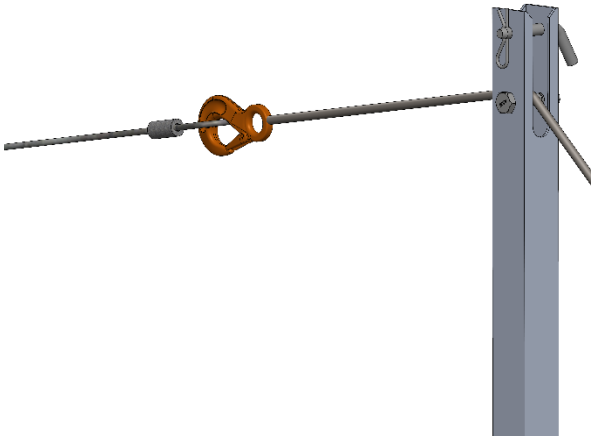


Figure 58 attach guy wire to lifting hook

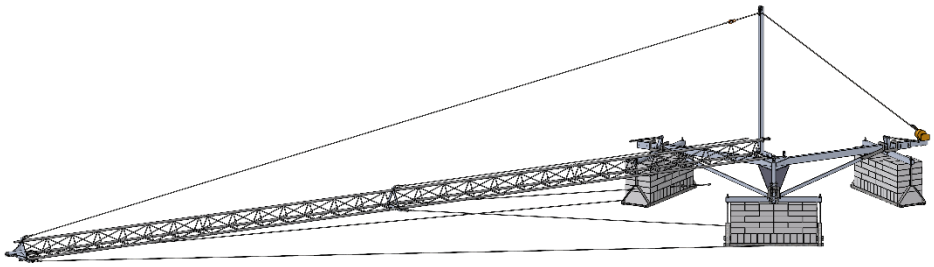


Figure 59 Attaching the lifting line to upper guy wire

7.10 Prepare to lift

◆**WARNING** Do not raise the tower in high winds as this can cause the tower to fail. Before raising the tower, ensure both the bolts connecting the hinged couplers are secured and aligned with the lift axis. While lifting the Kuva Tower ensure all workers are clear of the swing path of the Kuva Tower section, keep clear of the pinch points from when the tower is upright also. Ensure all cables are clear of these pinch points and the guy wires are managed by one or two people to avoid uncontrolled swinging guy wires and binding of the turnbuckles. When all these points are ensured, you may begin cranking the winch to raise the tower.

Note: It's recommended for two people to raise the end of the tower overhead for the first few feet to reduce the cranking load.

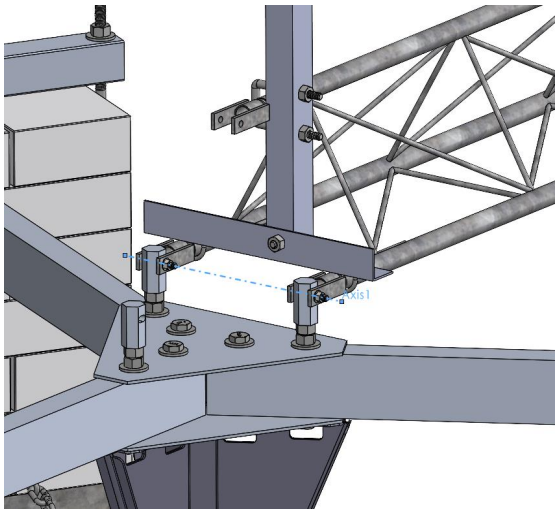


Figure 60 Correct gin pole position

Crank the winch to lift the tower 3 feet off the ground. You are now ready to install a pre-configured Kuva Camera.

Note: Supporting the tower horizontally with pipe jacks, rollers or wood pallets is mandatory while finishing the rest of the camera installation

8 Power requirements

The GCI360 Camera requires **24 - 32 VDC from a supply capable of delivering 2A** at the camera.

Note: Voltage loss with long cables must be compensated for by using higher AWG cable and by increasing the voltage at the DC supply. Use the table below to select the appropriate cable and power supply voltage for the installation.

8.1 Running DC Power to the Kuva Power Box

	Power Cable (to tower base)			
	12 AWG	14 AWG	16 AWG	18 AWG
Wire Length (')	Power Supply Voltage Required (32V Max)			
50	25 – 32	25 - 32	26 – 32	26 - 32
100	25 – 32	26 - 32	27 – 32	28 - 32
150	26 – 32	26 - 32	28 – 32	29 - 32
200	26 – 32	27 - 32	29 – 32	31 - 32
250	27 – 32	28 - 32	30 – 32	unsupported
300	27 – 32	28 - 32	31 – 32	unsupported
V drop per 50'	0.40	0.63	1.00	1.59

Refer to https://manganpower.com/dc-voltage-drop-calculator/ and http://wiresizecalculator.net/calculators/voltagedrop.htm as reference

For site line power instructions refer to section 8.2. for solar panel power instructions refer to section 8.3.

8.2 Site power (optional)

Note: Observe cabling requirements as per the power requirements in section 8.

1. Run a power cable to the Kuva Power Box.
2. Pass one end of the power cable through the bottom right electrical gland of the Kuva Power Box and connect the negative wire to the bottom of Terminal 1 and positive wire to the bottom of Terminal 2 as per Figure 61.
3. Refer to Section 8.5

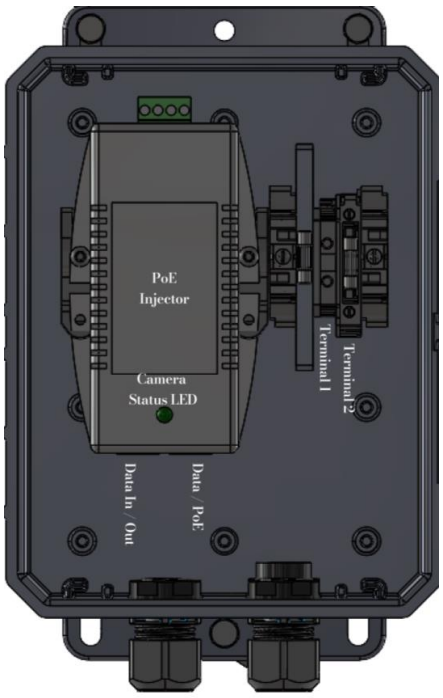


Figure 61 Kuva Power Box wiring

8.3 Solar & battery setup (optional)

Note: If power will be supplied to the GCI360 Camera from a commercial battery installation with one or more solar panels and a charge controller, carefully follow the power system manufacturer's installation and wiring instructions located in section 15.

Note: Observe cabling requirements as per the power requirements in section 8.

Figure 62 Optional solar panel installation

1. Run a power wire into load + and load - in the solar panel battery box (noting polarity) as per Figure 63.
2. Pass the other end of the power wire through the bottom of the Kuva Power Box right electrical gland and connect the negative to the bottom of Terminal 1 and positive to the bottom of Terminal 2 as per Figure 61.

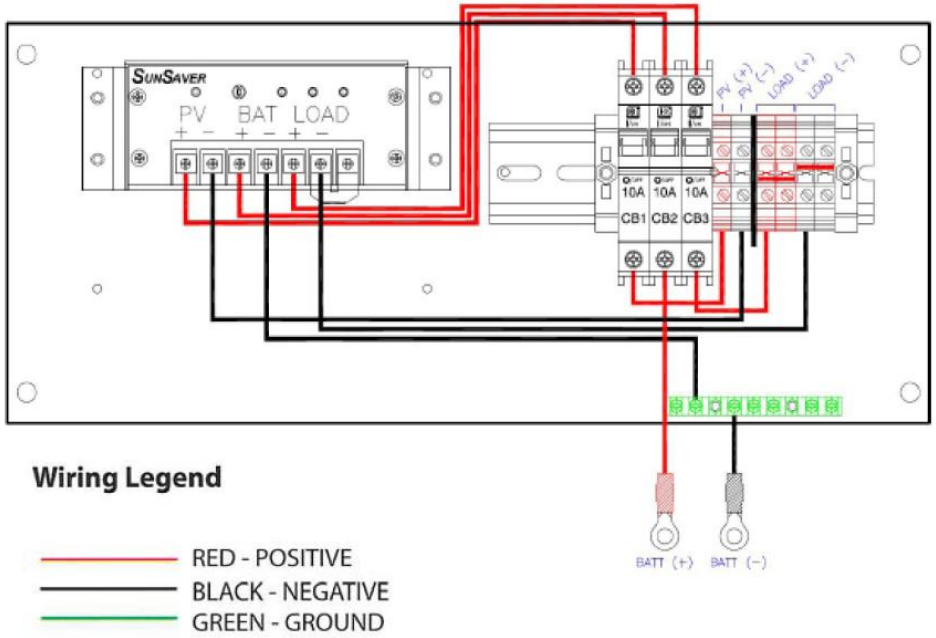


Figure 63 Solar panel battery box wiring

8.4 Ethernet connection (optional)

If the camera model does not have an antenna, then site ethernet is required.

Using CAT5/6 Ethernet cable with RJ45 connector, connect Ethernet through the left electrical gland into the Data In / Out connection on the PoE injector as per Figure 64.

Note: A single run of Ethernet cable is designed to work at a maximum distance of 100 meters, or 328'. A length longer than this can result in issues such as dropped packets, reduced performance, and loss of signal, particularly when using CAT5 cable due to being limited to 100 Mbps. Be sure to account for the 52 feet of Ethernet cable running up the tower to the camera.

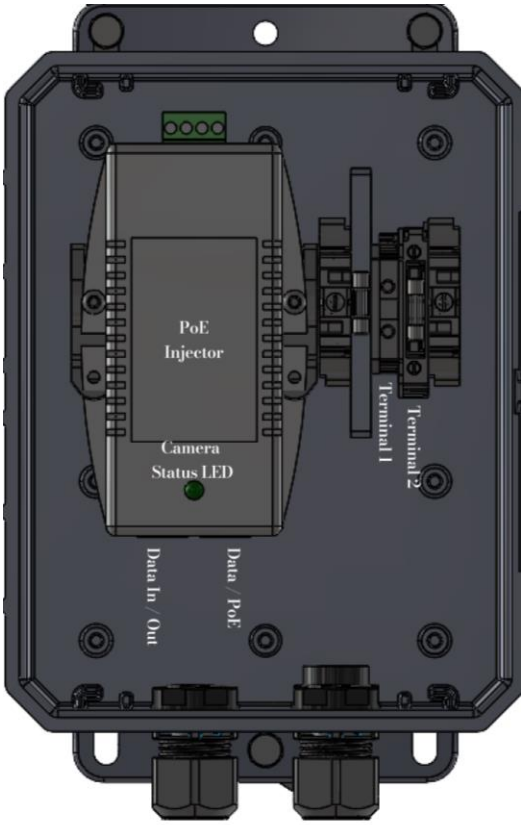


Figure 64 Data In/Out connection

8.5 Pre-Installation power check

Note: Confirm power is not activated at power source (line power or solar panel battery box) prior to wiring.

1. With the camera laying on its back panel on a clean surface connect the 50’ Ethernet cable to the GCI360 camera Ethernet port at the bottom of the camera post, via the RJ45 connection as per Figure 65. The supplied cable has a circular threaded retention mechanism that must be screwed down by hand to secure the power cable to the camera. Turn the ethernet cable locknut counterclockwise slowly until there is a click as the opening of the threads pass each other. Then tighten clockwise gently until the threads are engaged.

Note: Ensure the female connection on the camera post is not rotating when tightening the male end of the cable to the camera.

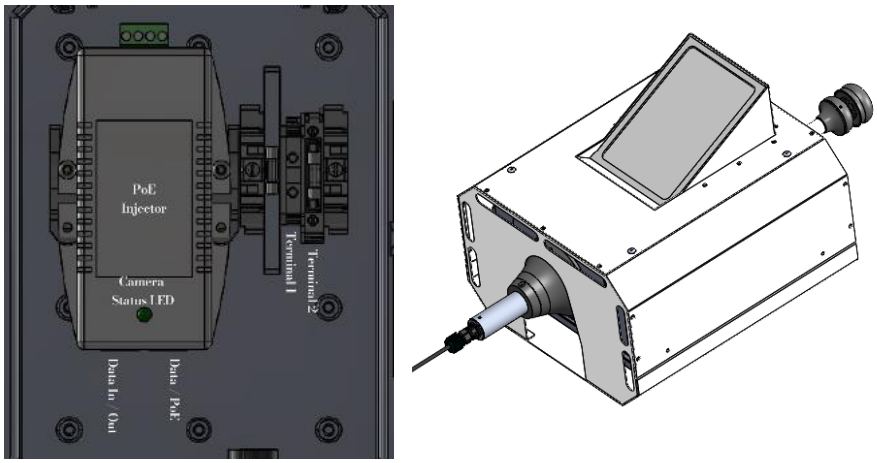
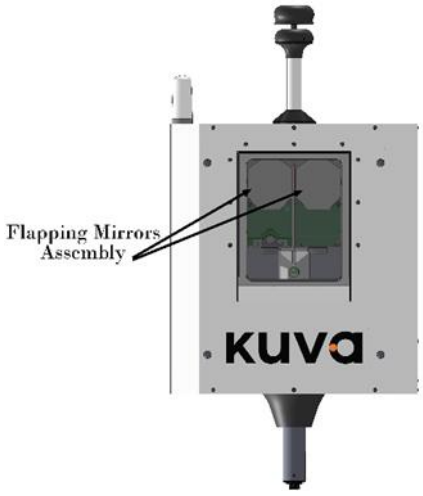


Figure 65 Kuva Power box and camera orientation

2. Next pass the other end of the RJ45 cable through the front of the Kuva Power Box and connect to the PoE injector, using the connection labeled “DATA/PoE” as per Figure 65.
3. Activate power at the power source (solar panel battery box or site line power).
4. The camera status LED (PoE Power LED) will temporarily turn red for approximately 10 seconds and then turn green as per Figure 65.
5. It will take approximately two minutes for the system to start up and the mirror to move. It will move for approximately 1 second.



2 minutes

Figure 66 Camera Mirrors

6. Confirm on the web app (app.kuva.cloud), that the device is connected to the cloud as per Figure 67.

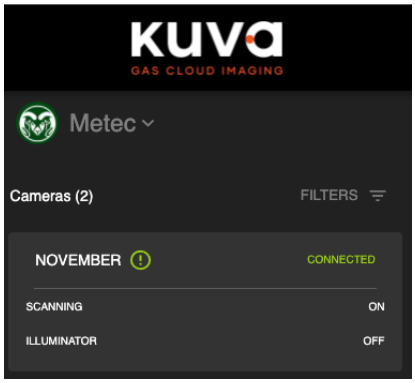


Figure 67 Kuva Web app

7. Turn scanning on and review image.
8. Turn off the power source (solar or line power) and disconnect the Ethernet cable from the camera.

9 Mounting the camera

For GCI360 camera mounting instructions for Utility pole refer to section 9.1. For GCI360 camera mounting instructions for Kuva Tower refer to section 9.2.

9.1 Utility pole camera attachment (optional)

◆**WARNING** Shall only connect Kuva Systems equipment to Class 2 or better utility pole.
Note: The instructions in this section pertain to installation of a GCI360 camera onto a utility pole. For Kuva Tower attachment refer to section 9.2.
◆**WARNING** Carefully follow the utility pole manufacturer's installation guide.
Note: It is recommended that the 10' aluminum conduit is installed after the utility pole has been installed and the mounting concrete is fully set or soil compacted.
Note: A level is needed when installing the rigid aluminum conduit onto the utility pole to ensure the conduit is vertically level. This is important for optimal image quality.
Note: Washers or spacers may be required to ensure the conduit is vertical.

Figure 68 Utility pole assembly

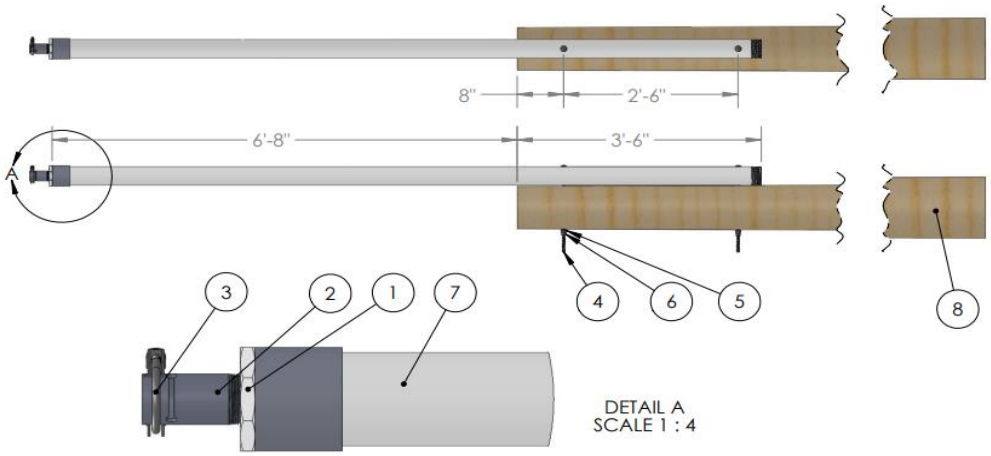


Figure 69 Utility pole mounting

Description	**Item #**
Utility pole conduit adapter	1
Camera top mount tube	2
Camera mount clamping U-bolt	3
½-13 x 16” galvanized carriage bolt	4
½” oversized washer	5
1/2 – 13 Galvanized hex nut	6
10’ x 3” rigid aluminum conduit	7
40’ class 2 utility pole	8

◆**WARNING** Ensure all threaded connections are tight through the total assembly.

1. Pre-drill 2 holes in the aluminum conduit with 5/8“ drill bit as per Figure 69.
2. On the aluminum conduit create an alignment mark 3’6” from the bottom of the conduit as per Figure 69

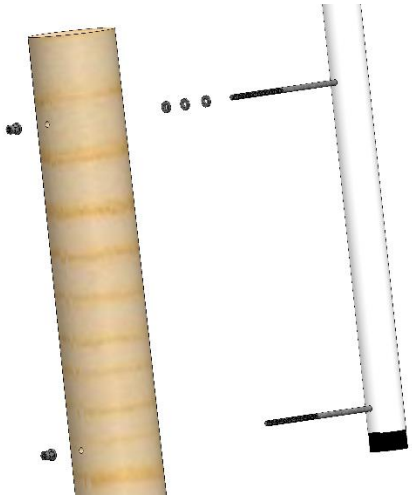


Figure 70 Aluminum conduit assembly to utility pole

3. Install 10’ rigid aluminum conduit onto the utility pole using (2) ½ -13 x 16” Carriage bolts, (2) ½” washers and (2) 1/2 – 13 Galvanized hex nut. Ensure the conduit is level when tightened.
4. Install the utility pole adapter to the 10’ aluminum conduit using 12” pipe wrench.

Figure 71 Utility pole adapter

5. Install 1 ½” conduit along the utility pole from the bottom of the 10’ aluminum conduit to approximately 4 feet from the ground.
6. Run 50’ long Ethernet cable through the aluminum conduit and electrical conduit leaving 10’ service loop at the bottom of the tower to make connections at the Kuva power box.

⚠**CAUTION**: Circular Ethernet connector threads can cross-thread. Ensure thread alignment before tightening.

9. Connect the Ethernet cable to the GCI360 Ethernet port at the base of the camera post, via the RJ45 connection as per Figure 72. The supplied power cable has a circular threaded retention mechanism that must be screwed down by hand to secure the power cable to the camera. Turn the ethernet cable locknut counterclockwise slowly until there is a click as the opening of the threads pass each other. Then tighten clockwise gently until the threads are engaged. Ensure the male connection on the camera post is not rotating when tightening the female end of the cable to the camera.

10. Once the Ethernet cable is secured to the GCI360 Camera, slide the base post of the camera into the camera top mount tube. The camera's base post should be fully engaged into the camera top mount, the bottom of the pan hub of the GCI360 base should be flush with the top of the camera top mount tube.

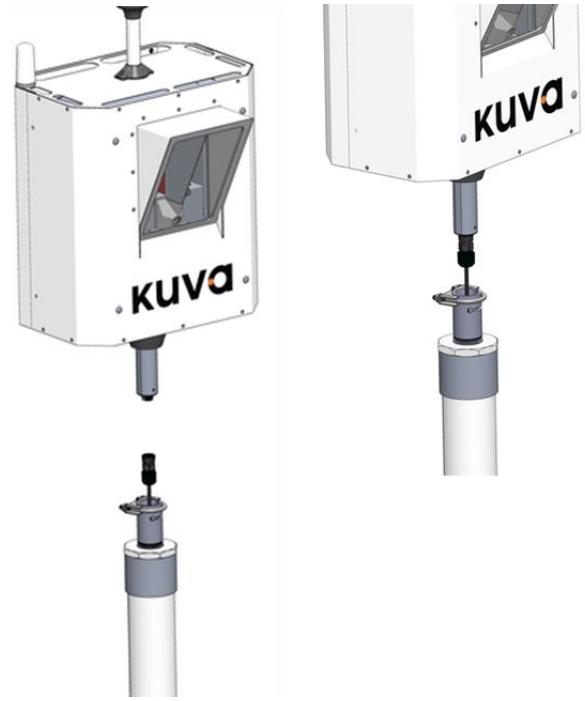


Figure 72 Utility pole ethernet connection

11. Secure a 1.75" diameter U-bolt halfway down the vertical groove, and with the center of the U-bolt lining up with the center of the vertical groove, as per Figure 73, to compress the mount section against the Kuva camera mount together.

◆**WARNING:** A ¼" space must be between the bottom of the camera mounting post and the top of the U-bolt and no part of the U-bolt can touch the camera mounting post.

12. Tighten the (2) 1/2" nuts ¼ turn each until there is no independent movement between the Kuva Camera and the aluminum conduit. If any movement is possible

by hand, perform another ¼ turn on the U-bolt nuts and check for movement again, until movement is no longer possible. Final torque spec 100 in-LB.

Figure 73 Camera post mounting configuration and bracket.

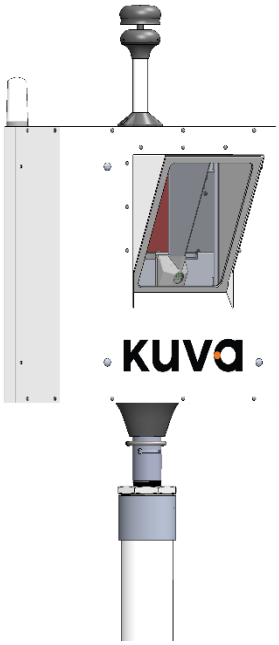


Figure 74 Mounted camera

1. Refer to section 10.2

9.2 Kuva Tower camera mounting (optional)

Note: The instructions in this section pertain to installation of a GCI360 Camera onto a Kuva Tower. Refer to section 9.1 for utility pole mounting.

1. Run the 50’ long Ethernet cable through the middle of Kuva Tower and then through the Kuva Tower top plate section.

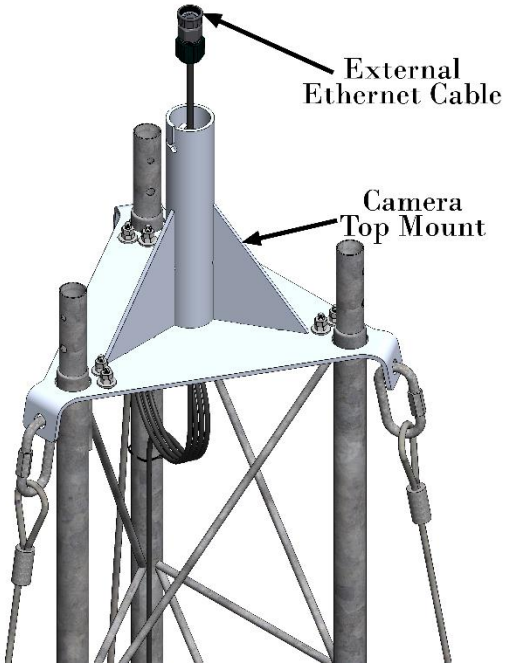


Figure 75 Ethernet cable placement

⚠**CAUTION**: Circular Ethernet connector threads can cross-thread. Ensure thread alignment before tightening.

2. Connect the Ethernet cable to the GCI360 Ethernet port at the base of the camera post, via the RJ45 connection as per Figure 76. The supplied power cable has a circular threaded retention mechanism that must be screwed down by hand to secure the power cable to the camera. Turn the ethernet cable locknut counterclockwise slowly until there is a click as the opening of the threads pass each other. Then tighten clockwise gently until the threads are engaged. Ensure the male connection on the camera post is not rotating when tightening the female end of the cable to the camera.
3. Once the Ethernet cable is secured to the GCI360 Camera, slide the base post of the camera into the camera top mount tube. The camera's base post should be fully engaged into the camera top mount, the bottom of the pan hub of the GCI360 base should be flush with the top of the camera tube.

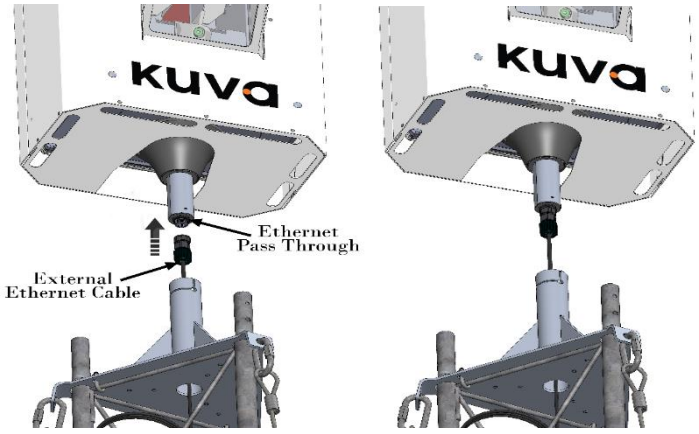


Figure 76 Ethernet connection to camera

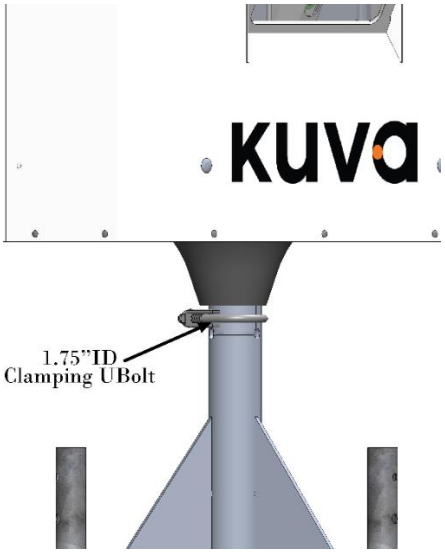


Figure 77 Camera installed.

4. Secure a 1.75” diameter U-bolt halfway down the vertical groove, and with the center of the U-bolt lining up with the center of the vertical groove as per Figure 78 to compress the mount section against the Kuva camera mount together.

◆**WARNING:** A ¼” space must be between the bottom of the camera mounting post and the top of the U-bolt and no part of the U-bolt can touch the camera mounting post.

5. Tighten the (2) 1/2“ nuts ¼ turn each until there is no independent movement between the Kuva camera and the tower. If any movement is possible by hand, perform another ¼ turn on the U-bolt nuts and check for movement again, until movement is no longer possible. Final torque spec 100 in-LB.

6. Leave a 1’service loop available for the ethernet cable.
7. Add cable ties to secure the ethernet cable to the tower legs.

Figure 78 Camera post mounting configuration and bracket.

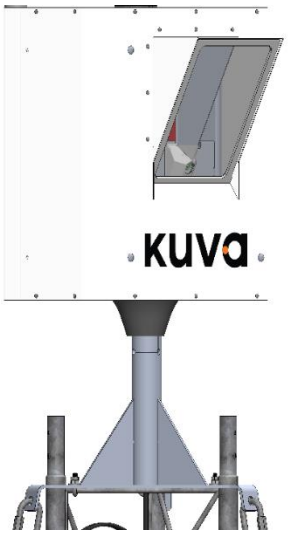


Figure 79 Mounted camera

9.3 Lifting the Kuva Tower

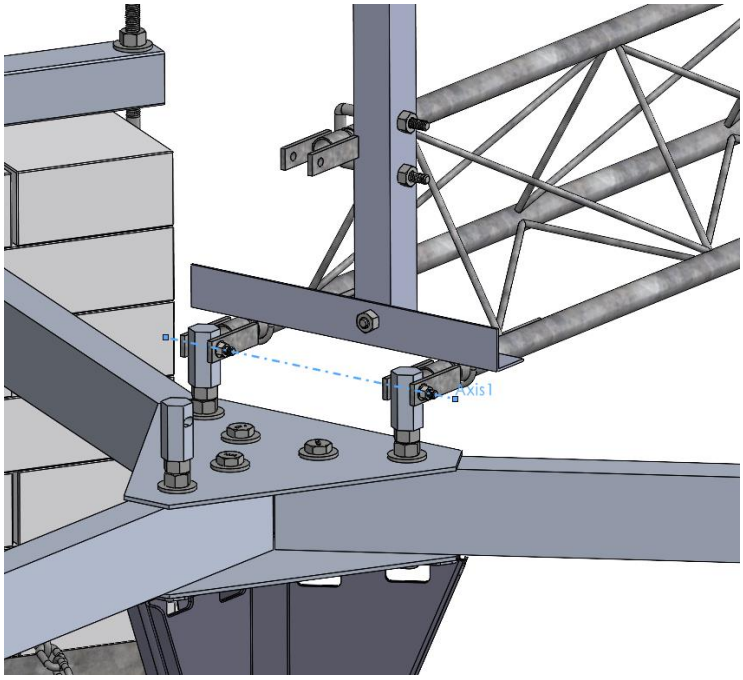


Figure 80 Correct gin pole position

◆WARNING confirm all personnel are clear of the lifting area when the tower is being erected.

Note: It's recommended for two people to raise the end of the tower over head for the first few feet to reduce the cranking load.

1. Slowly crank the winch, raising the tower.
2. When the tower is 95% upright review the center Rohn hinge and confirm it will align with the slotted threaded coupling block. Minor adjustments can be made by pulling on the gin pole to align the hinge with coupling.
3. Once the tower is raised, guide the center Rohn stub over the slotted threaded coupling block and secure with provided hardware as per Figure 81.

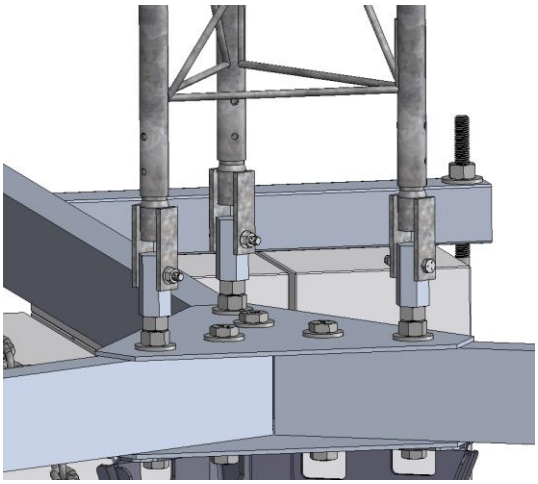


Figure 81 Final connection of Kuva Tower Section / hinged coupler after lift

9.4 Secure and tension guy wires

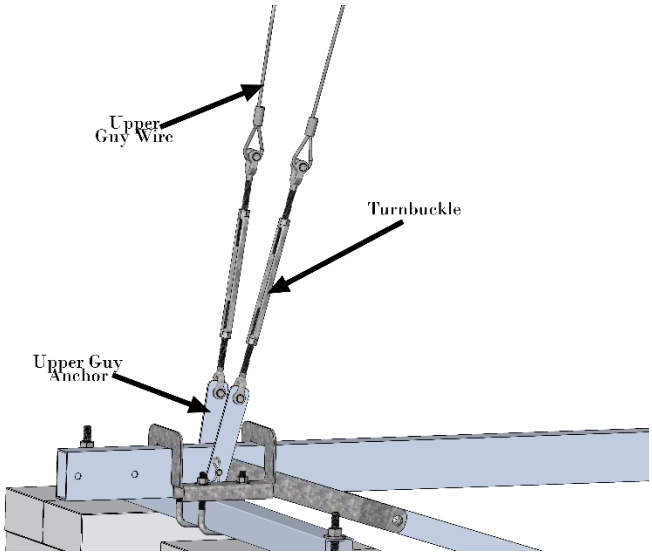


Figure 82 Guy wires connected to Kuva Tower base

1. Connect the lower guy wire to the front leg / winch leg turnbuckle before disconnecting the lifting line.
2. Disconnect the gin pole and winch assembly and store them.
3. Connect the remaining guy wires to the remaining turnbuckle.
4. Then, beginning with the shorter guy wires, adjust the turnbuckles bringing those up to 330#, using the supplied tension gauge as per Figure 83, working around to the different legs so they are tensioned evenly.

Figure 83 Tension gauge

5. Do the same for the longer guy wires, to 330#. Then go back to the shorter guy wires and bring those up to 450#.
6. Finally bring the longer guy wires to 450#.
7. Confirm all shorter and longer guy wires are all at 450#.
8. The tower is now secure.

10 Kuva Power Box Installation

If the Kuva power box is to be installed to a Kuva Tower refer to section 10.1. If the Kuva Power Box is to be installed to a utility pole refer to section 10.2.

10.1 Kuva Power Box installation to Kuva Tower

1. Place the Kuva Power Box and (3) loop clamps in desired position on the Kuva Tower as per Figure 84 and Figure 85.
2. Place (3) bolts, (3) nuts and (3) washers and tighten into place.

Note: Recheck the Kuva Power Box often during clamp tensioning; care should be taken to not overtighten the nuts.

Figure 84 Kuva Tower Power Box location

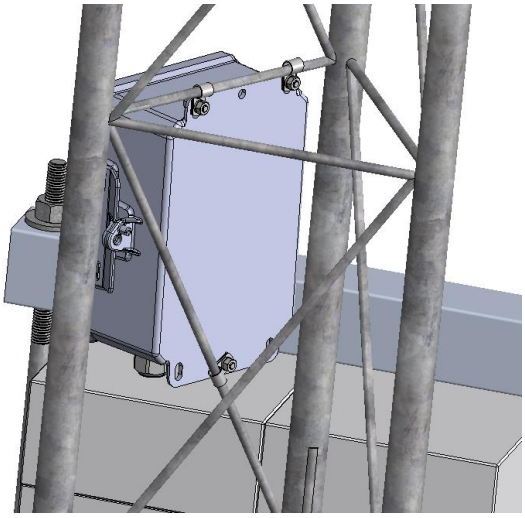


Figure 85 Kuva Power Box Installation

10.2 Kuva Power Box installation to utility pole

1. Remove both hose clamps from the Kuva Power Box installation kit.

Note: Nuts, bolts, and washers remaining are for Kuva Tower alternate installation.

2. Feed the hose clamp through slots in corners of Power Box mounting flange at the top of the Kuva power box as per Figure 86. Repeat with the second hose clamp at the bottom of the Kuva power box.

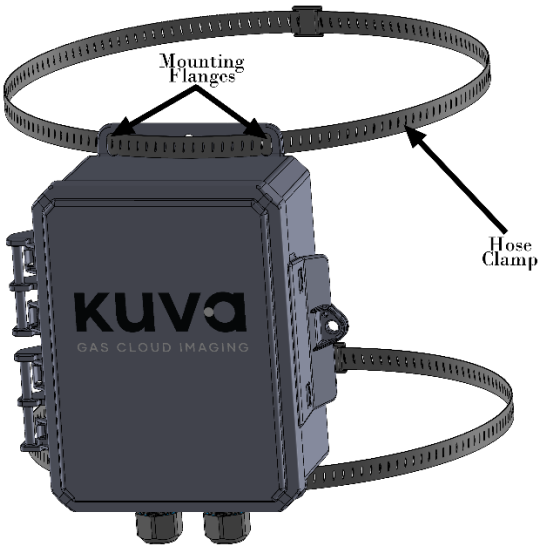


Figure 86 Hose clamp installation

NOTE: Leave ends of hose clamp unfastened and ensure that “tails” are of equal length.

3. Place Kuva Power Box and hose clamps in desired position on utility pole as per Figure 87 and Figure 88.

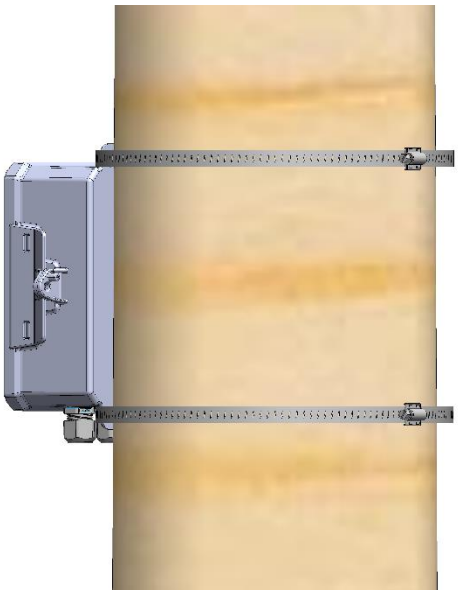


Figure 87 Kuva Power box attachment to utility pole

Figure 88 Kuva Power Box utility pole assembly

4. Pass ends of hose clamps through hex/flathead tensioning mechanism.
5. Tighten the hose clamps until Kuva Power Box is held firmly against the utility pole.

Note: Recheck Kuva Power Box often during clamp tightening; care should be taken to not overtighten the hose clamps.

11 Powering the camera

⚠**CAUTION**: Follow the installation instructions in the optional section 8.2 or section 8.3 before proceeding to power the camera.

1. Pass the end of the RJ45 Ethernet cable through the bottom left electrical gland in the Kuva Power Box as per Figure 89 and connect the other end of the Ethernet cable into the provided PoE injector, using the connection labeled “DATA/PoE”.

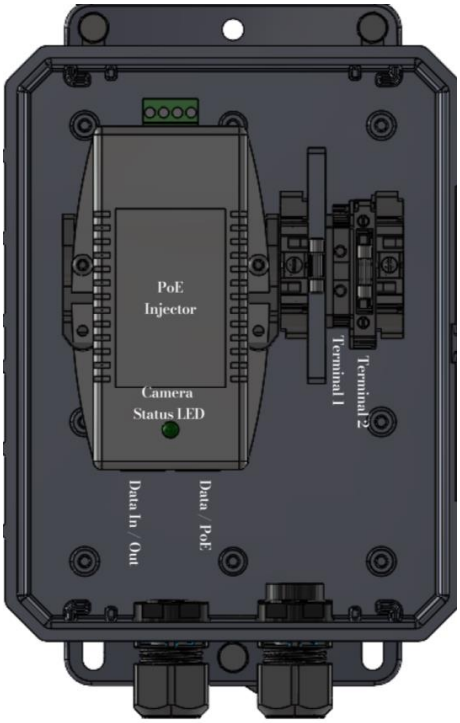


Figure 89 Kuva Power Box

2. Ensure all electrical connections are in place and secured.
3. Enable the power source (solar panel battery box or line power).
4. The camera status LED (PoE Power LED) will temporarily turn red for approximately 10 seconds and then turn green as per Figure 89
5. Verify camera connectivity by logging into the customer dashboard (URL and access credentials provided separately), navigating to the proper organization and selecting the camera from the device list. The device's name upon delivery should be the Serial Number (e.g. SN99).

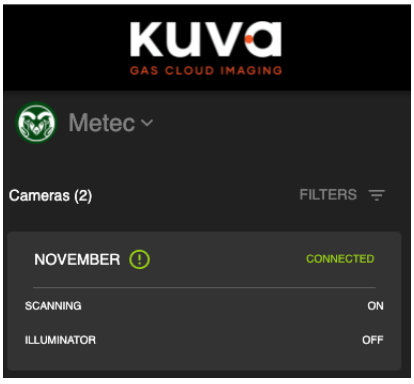


Figure 90 Successful connection of a GCI360 camera to the Kuva Cloud.

6. Complete any remaining configuration steps to tailor the camera to its site installation, including final positioning and image framing, test image uploads.
7. Take a panorama image of the site. This can take up to 5 min to perform.
8. Set the POI
9. Turn scanning on
10. Set camera preferences
11. Review the first image for quality and clarity.

Installation is now complete. Clean up on site and finalize commissioning.

12 Kuva Tower & Kuva Camera disassembly

12.1 Powering down the camera

1. Disable the power source (solar panel battery box or line power).
2. Disconnect the breaker in the Kuva Power Box at Terminal 2

⚠ CAUTION: Ensure all external power wires and conduit are disconnected and removed and will not interfere with tower lowering.

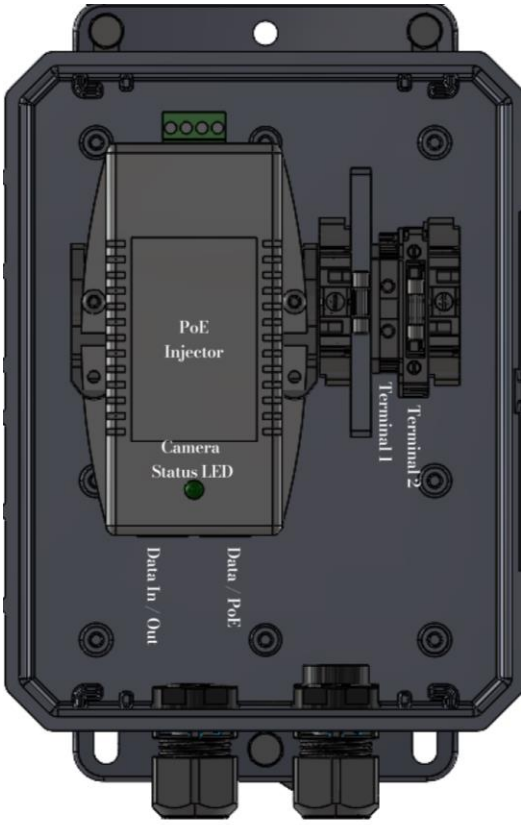


Figure 91 Kuva Power Box

12.2 Attach the lowering line

1. Install the winch extension piece into the front tower leg using (2) 5” clevis pins and cotter pins as per Figure 92 and Figure 93.

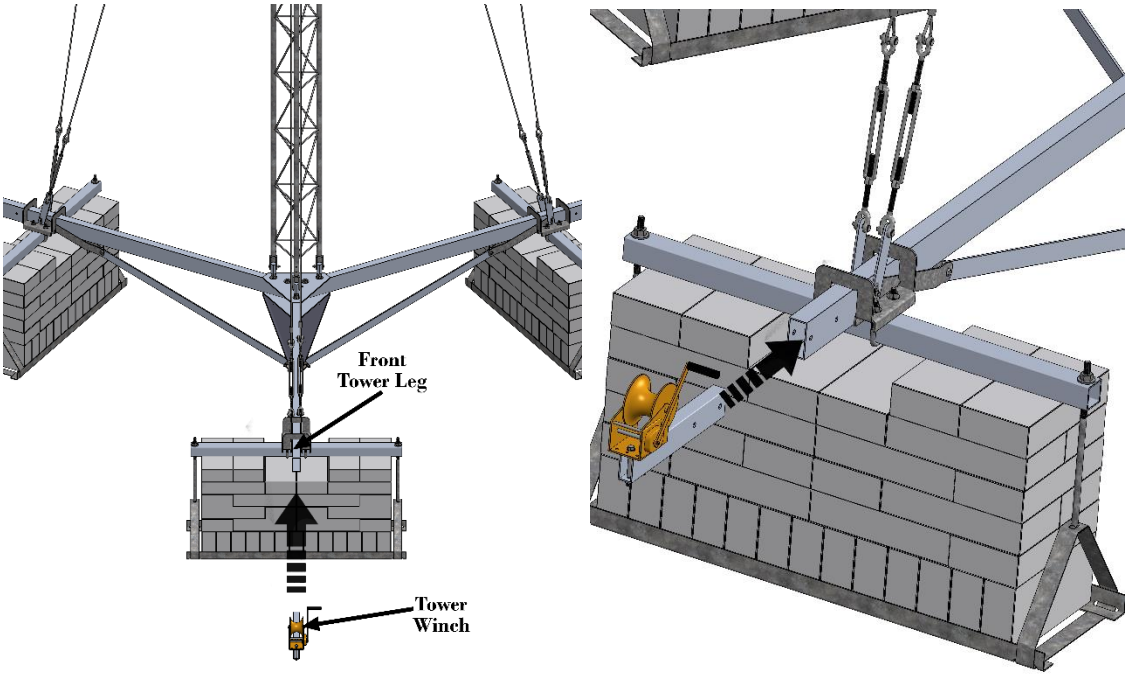


Figure 92 Inserting winch extension

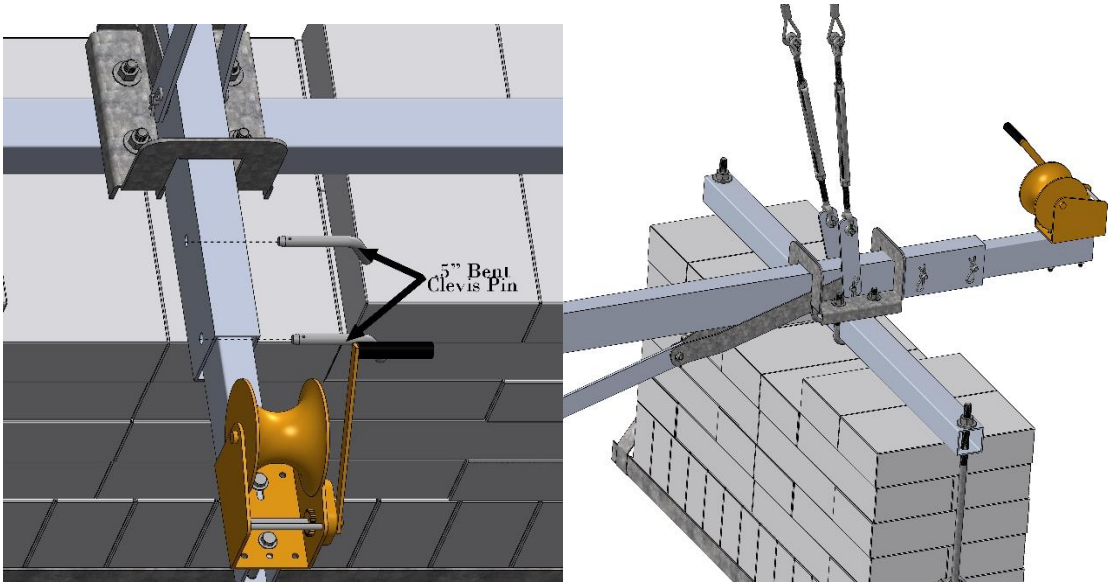


Figure 93 Winch extension attachment

2. Unravel the lift line from the winch so there is enough slack to mount over the gin pole bolt as per Figure 95.

◆WARNING confirm gin pole angle iron bolt connection is tight as per Figure 94.

Figure 94 Gin pole

3. On the gin pole, remove the cotter pin and the gin pole clevis pin and feed the lift line from the winch to the top of the gin pole bolt then replace the gin pole clevis pin and re-insert the cotter pin onto the gin pole clevis pin as per Figure 95.

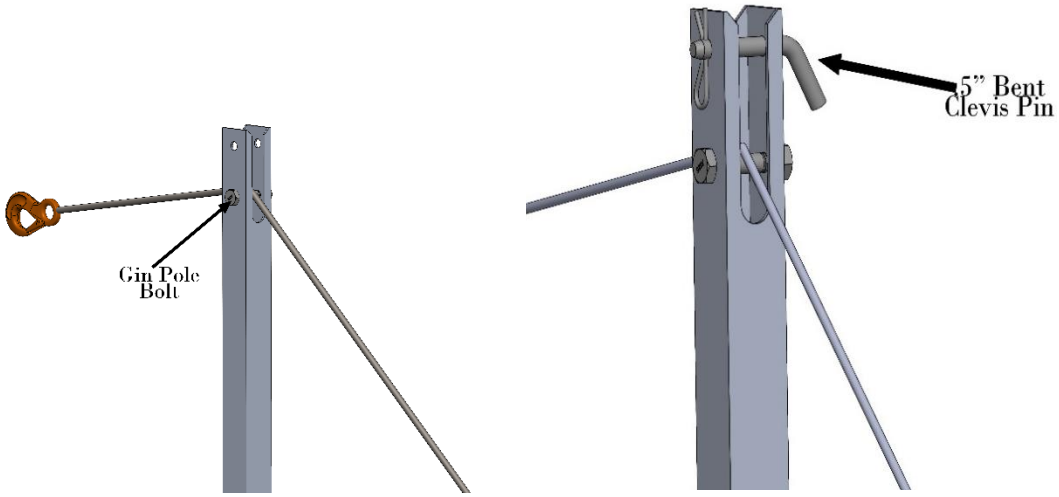


Figure 95 Gin pole bolt and clevis pin

12.3 Attach the gin pole to the Kuva Tower

◆**WARNING** Attach the gin pole so it is below the bottom bolts of the Kuva Tower and above the hinged coupler as per Figure 96. The 1-1/2" U-bolt must locate in the grooved area. Failure to do this can cause the tower section to fail when lowering.

1. Mount the gin pole to the 40’ Kuva Tower with provided 1- ½” U-bolts and square U-bolt as per Figure 96 and Figure 97.

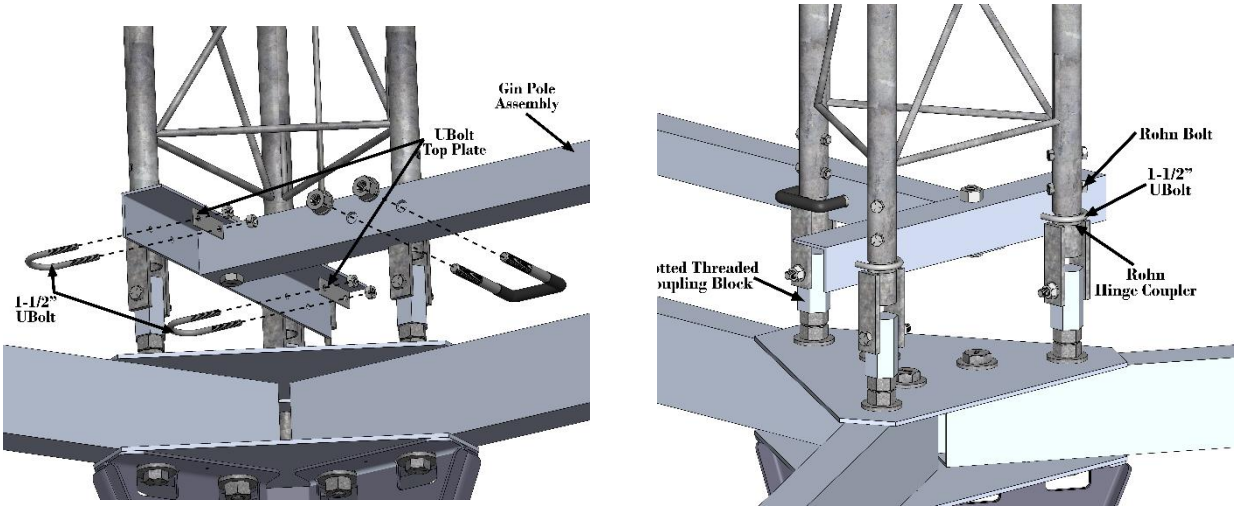


Figure 96 Mounting the gin Pole assembly

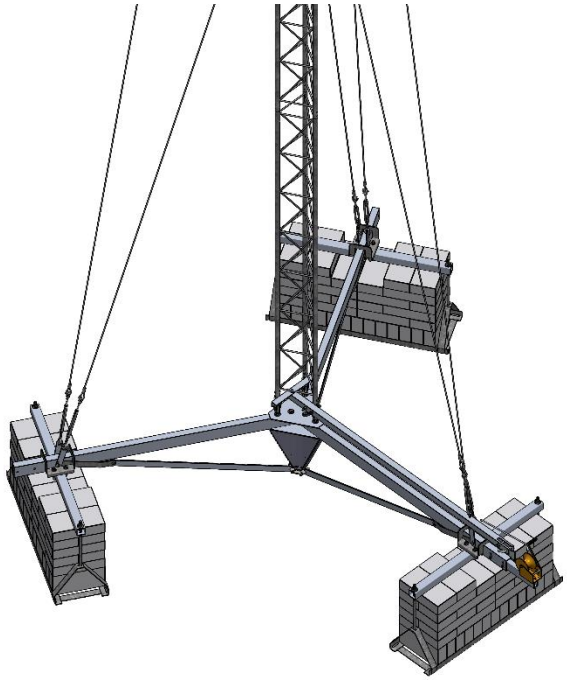


Figure 97 Gin pole assembly

2. Evenly loosen all guy wires to finger tight.
3. Remove the longer guy wire from the front leg and attach the wire eyelet to the lifting line hook.
4. Using the winch, tension the lifting line.
5. Remove the short guy wire on the front leg.
6. Thread the shorter guy wire through the Kuva Tower to keep secure from tangling during lowering the tower.

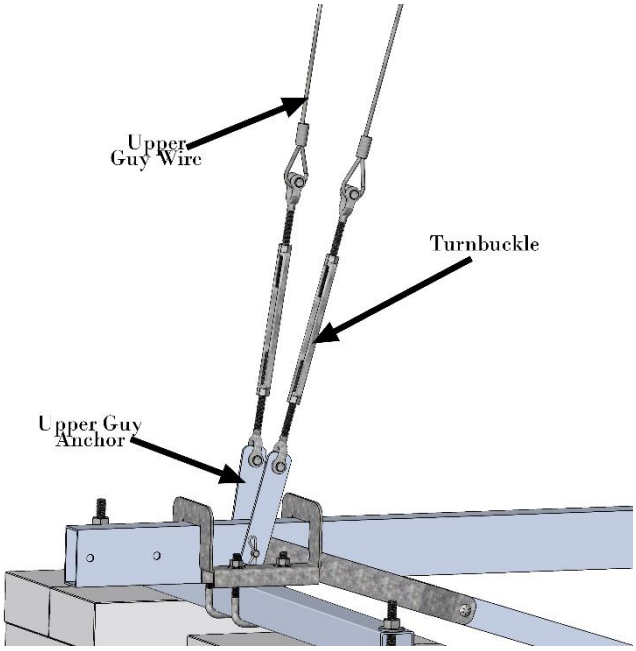


Figure 98 Turnbuckle connection

7. Connect the longer guy wire eyelet to the lifting line hook as per Figure 99.

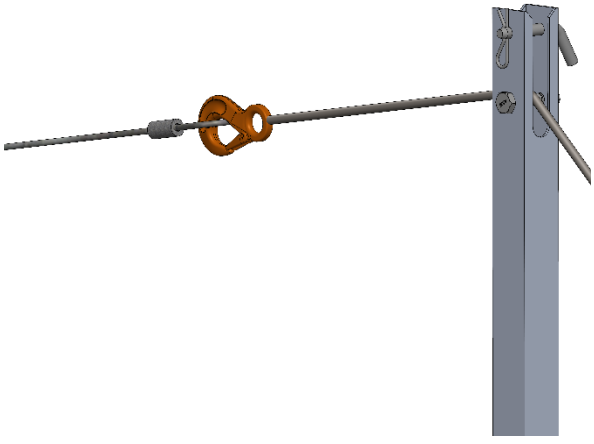


Figure 99 attach guy wire to lifting hook

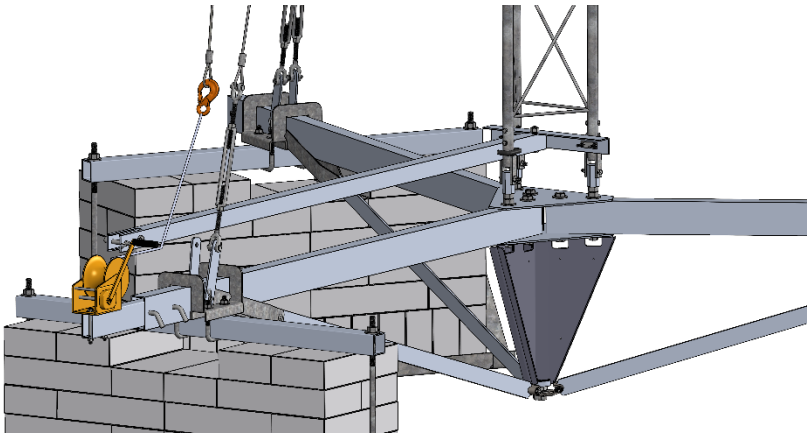


Figure 100 Attaching the lifting line to guy wire

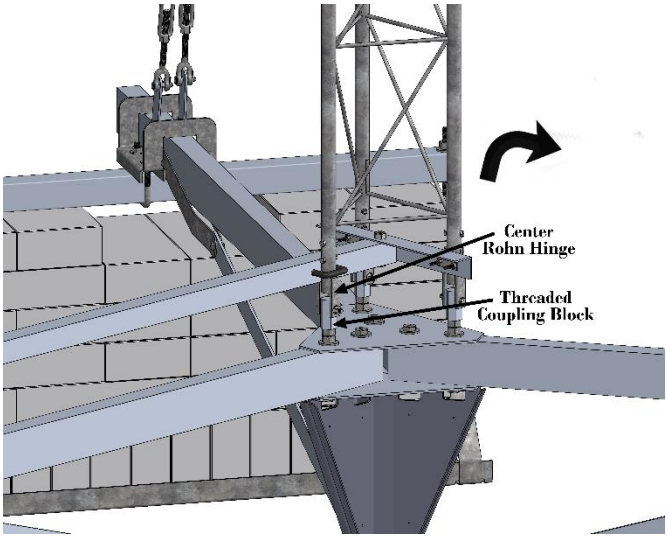


Figure 101 Correct gin pole position

8. Connect the longer guy wire eyelet to the lifting line hook as per Figure 99.
9. Create a minor amount slack on the winch.
10. Loosen the bolt in the slotted threaded coupling block.
11. The gin pole can be used as a lever to help loosen the bolt. Disconnect the hardware from the slotted threaded coupling block facing the front leg.

12.4 Prepare to lower the tower

◆**WARNING** Do not lower the tower in high winds as this can cause the tower to fail. Before lowering the tower, ensure both the bolts connecting the hinged couplers are tight. While lowering the Kuva Tower ensure all workers and equipment are clear of the swing path of the Kuva Tower section, keep clear of the pinch points from when the tower is lowered. Lower the tower very slowly and smoothly.

1. Begin cranking the winch to lower the tower.

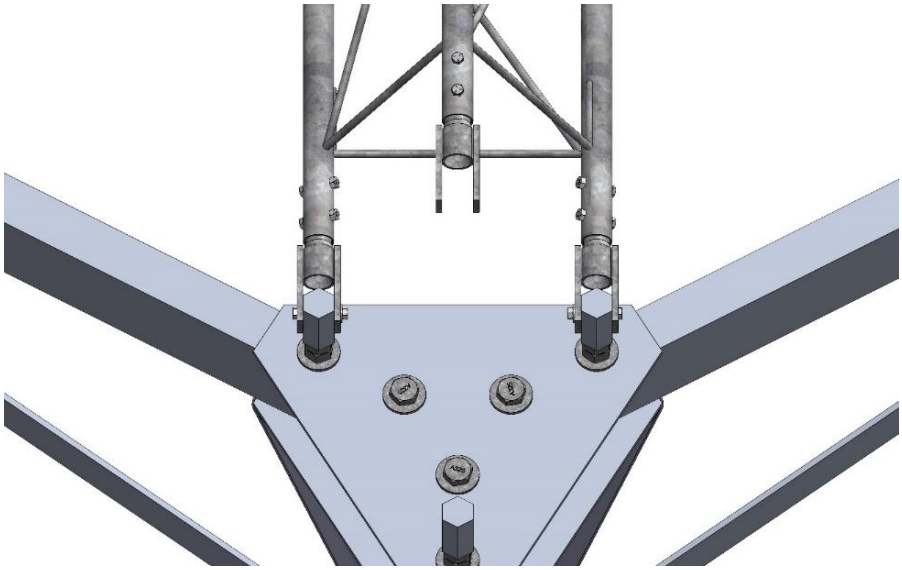


Figure 102 Kuva Tower connection

2. Crank the winch to lower the tower to 3 feet off the ground. You are now ready to de-install the Camera.

Note: Supporting the tower horizontally with pipe jacks, rollers or wood pallets is mandatory while finishing the rest of the camera de-installation

12.5 Kuva Camera disconnection

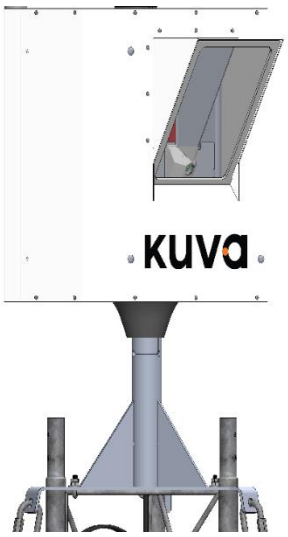


Figure 103 Mounted camera

Figure 104 Camera post mounting configuration and bracket.

1. Remove the cable ties securing the 50’ Ethernet cable to the Kuva Tower legs.
2. Loosen the (2) 1/2“ nuts from the 1.75” diameter U-bolt.

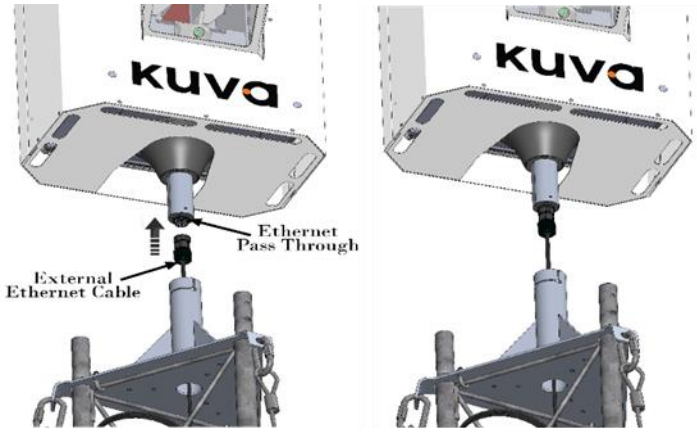


Figure 105 Ethernet connection to camera

3. Slide the base post of the camera out of the camera top mount tube.
4. Disconnect the Ethernet cable from the GCI360 Ethernet port at the base of the camera post turning counter clockwise , via the RJ45 connection as per Figure 105.

⚠**CAUTION** Do not set the camera down onto the bottom end of the camera’s mounting post as per Figure 106. This will damage the RJ45 port that supplies

power to the camera. When laying the camera down, only rest it on the back panel. Place it on a surface that won't cause damage to the camera.

Figure 106 CGI360 Kuva Camera

5. Disconnect the Ethernet cable from the GCI360 Ethernet port at the base of the camera post turning counter clockwise , via the RJ45 connection as per Figure 105.
6. Place the camera on its backside on a clean, flat surface.
7. Fully lower the tower to the ground.
8. Disconnect power from the Kuva power box as per Figure 107.
9. Prepare the 50' ethernet cable for shipping.

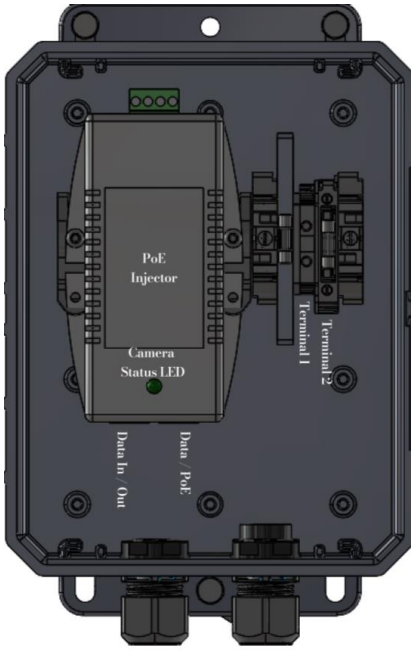


Figure 107 Kuva Power Box

10. On the Kuva Power Box loosen the (3) bolts, (3) nuts and (3) washers and remove and prepare for shipment.

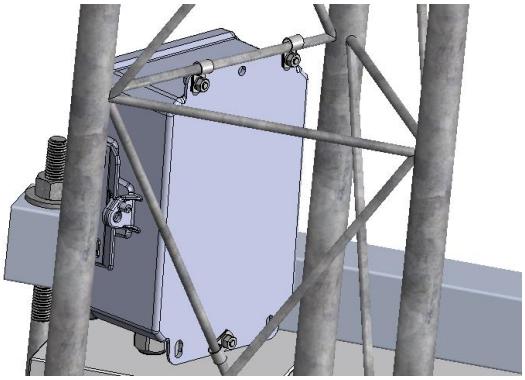


Figure 108 Kuva Power Box

11. Disconnect the lowering line.
12. On the gin pole remove the cotter pin and the gin pole clevis pin and remove the lowering line from the gin pole. Replace the gin pole clevis pin and re-insert the cotter pin onto the gin pole clevis pin.

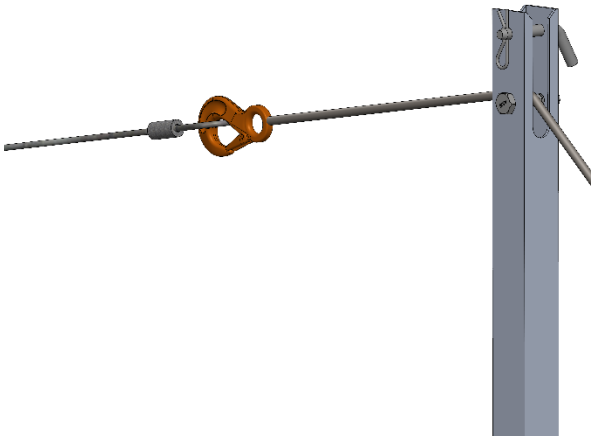


Figure 109 guy wire to lifting hook

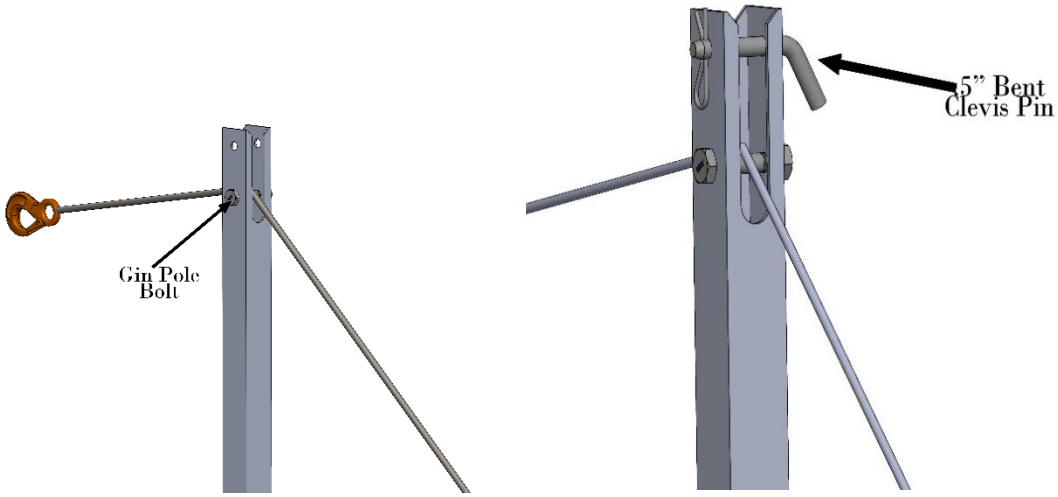


Figure 110 Gin pole bolt and clevis pin

13. Remove the gin pole from the Kuva Tower by removing the 1- ½" U-bolts and square U-bolts and prepare for shipment.

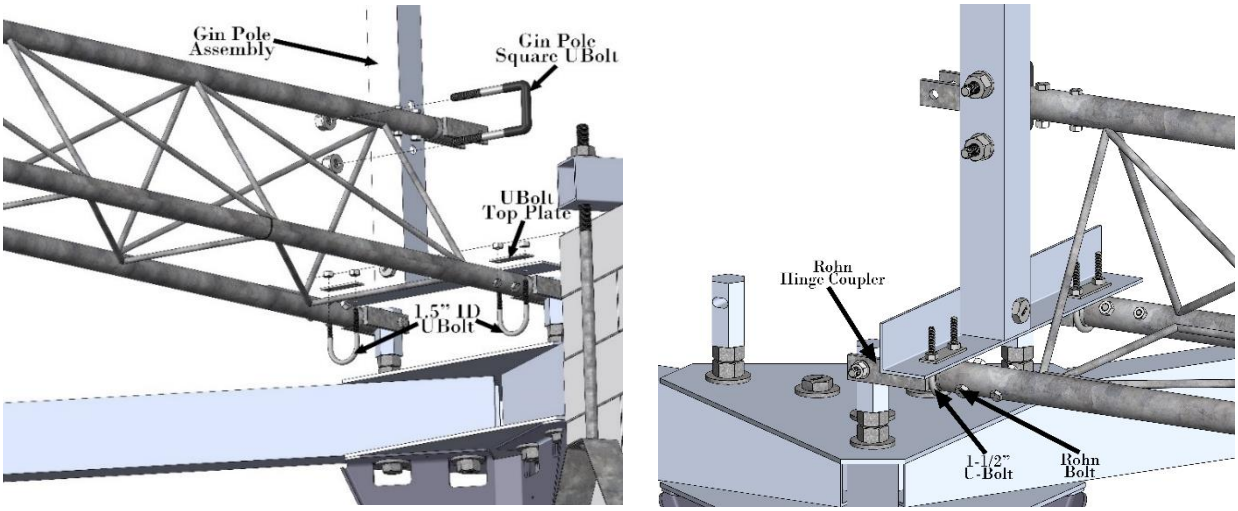


Figure 111 gin Pole assembly

14. Cinch up the winch and lowering line and remove the winch extension piece from the front tower leg removing (2) 5” clevis pins and cotter pins as per Figure 112 then prepare for shipment.

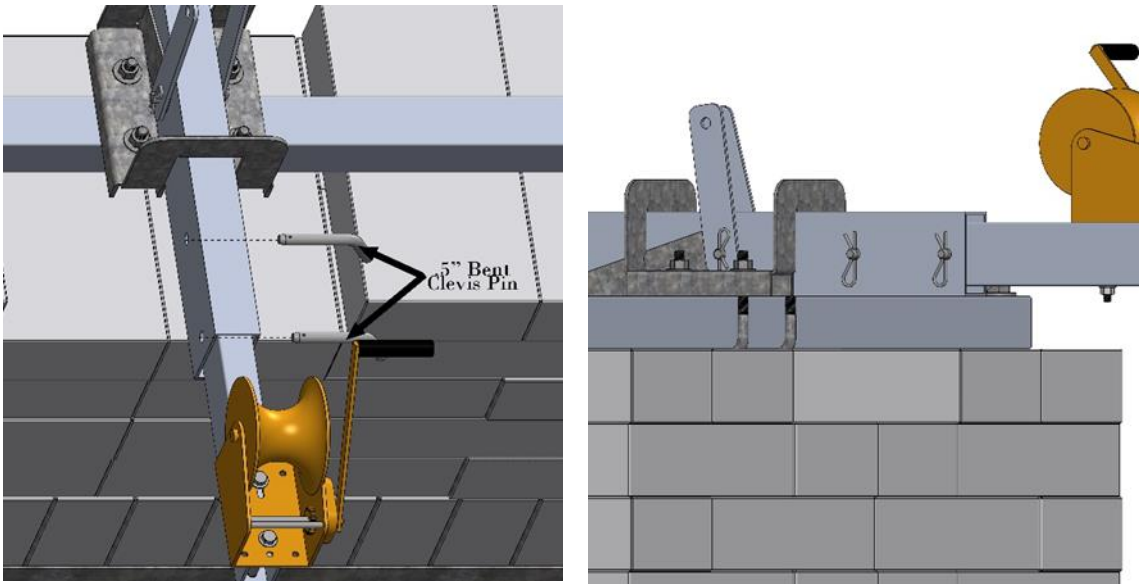


Figure 112 Winch removal

12.6 Rohn hinge detachment

1. Remove the (2) 5/8” Head bolts, (2) 11/16” nuts and washers connecting the (2) Rohn hinges from the coupling blocks.

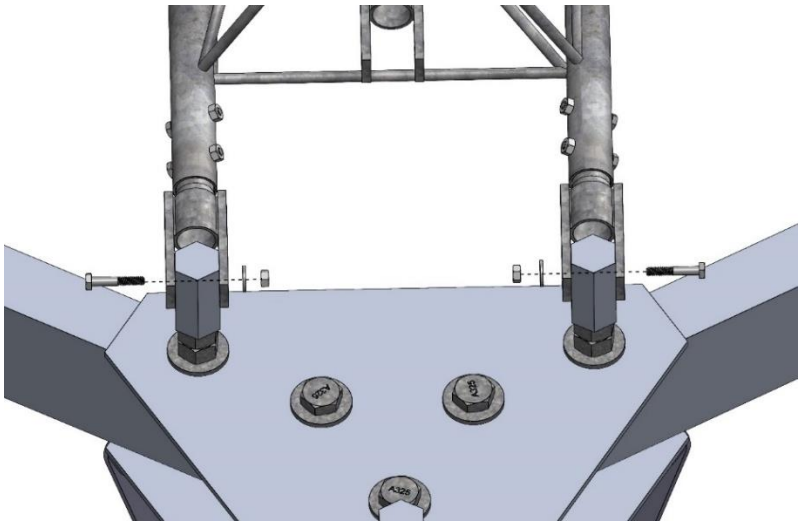


Figure 113 Kuva Tower to base assembly

2. Remove the 40’ Kuva Tower section from the threaded coupling blocks on the Tower Base.

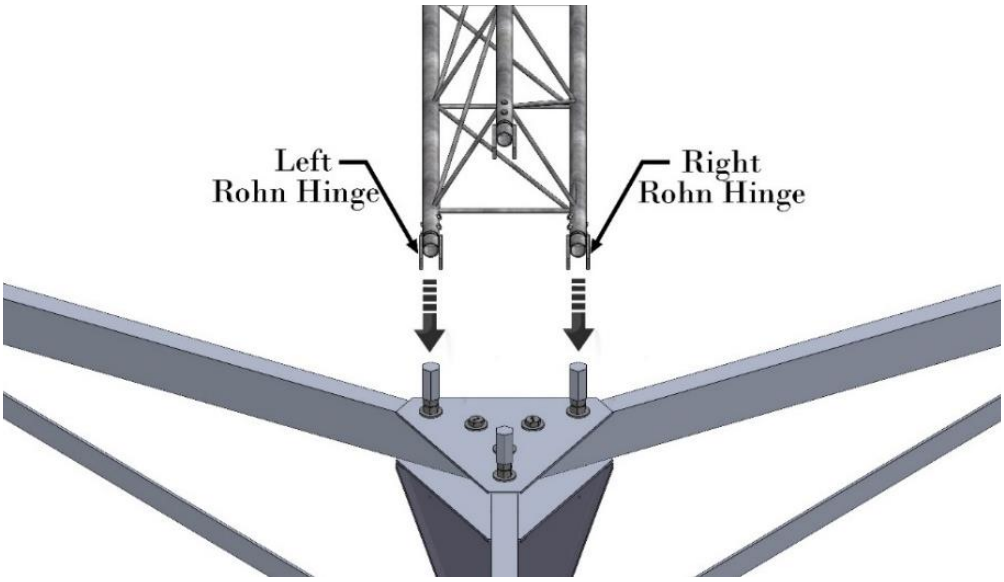


Figure 114 Kuva Tower to base assembly

3. Lay the Kuva Tower section on the ground.

4. Disconnect the 40’ Kuva Tower at the midpoint by removing (3) 7/16” head bolt and (3) 1/2” Nuts. Then remove (3) 1/2” head bolt and (3) 9/16” nuts as per Figure 115 .

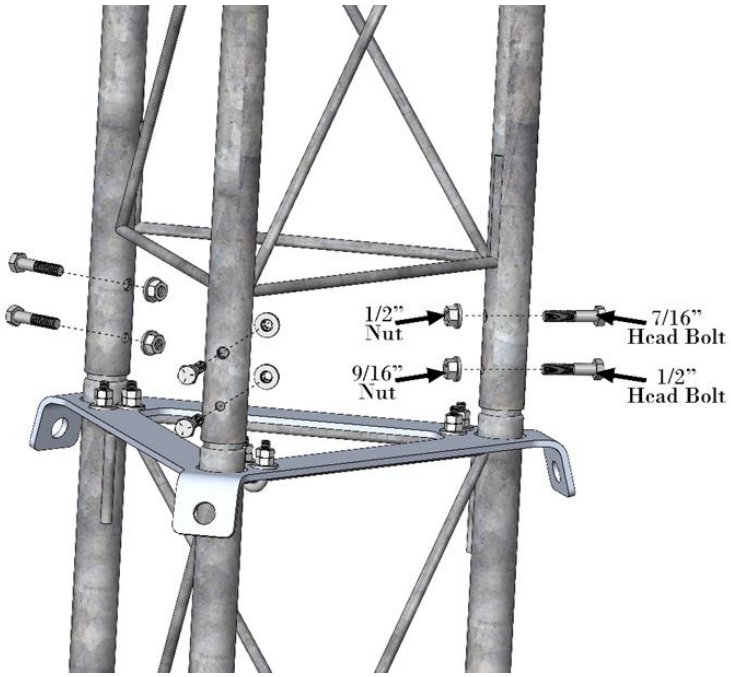


Figure 115 40' Kuva Tower bolt locations

5. Separate the (2) 20' Kuva Tower sections preparing for shipping.

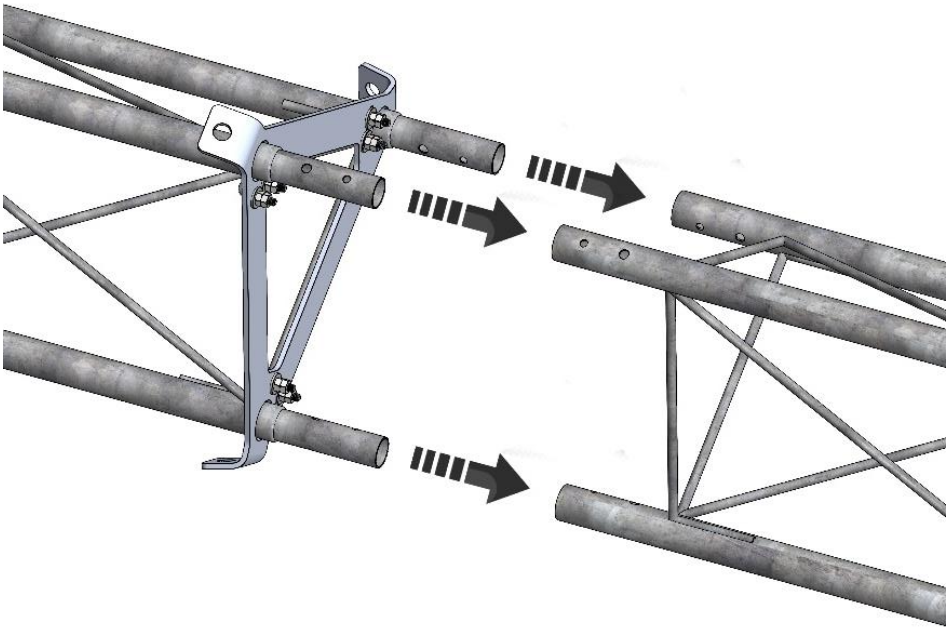


Figure 116 40' Kuva Tower disassembly

6. Loosen the tension members using the kingpost hex bolt secured to the Starplate under the Tower Base. Use a 1-1/2” wrench to turn the kingpost hex bolt turning clockwise.

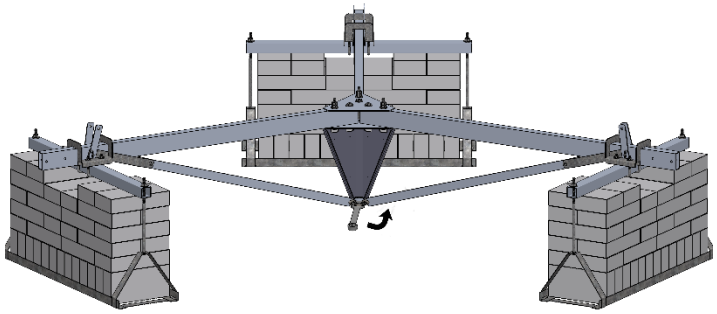


Figure 117 loosen tension members

12.7 Preparing the Tower Base

1. Loosen (6) 5-1/2” bolts as per Figure 118.

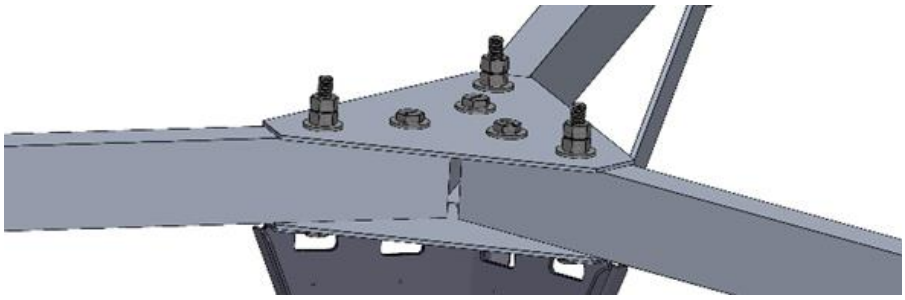


Figure 118 Tower Base

2. Remove the locknuts from the carriage bolts on the 3 kingpost guy anchors. Disconnect the end of the tension member from all 3 kingpost guy anchors.

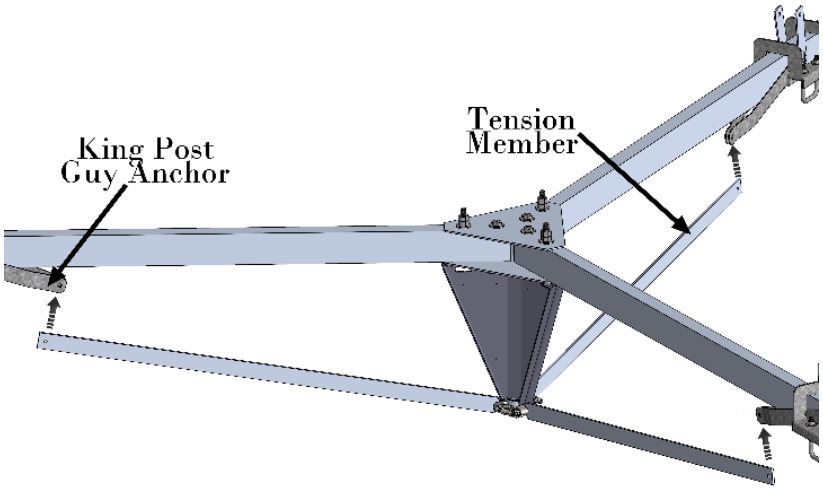


Figure 119 King post guy anchor tension member assembly

3. Remove the (3) tension members from the bottom of the Starplate assembly by removing (3) 3-1/2” bolts and (6) hex nuts as per Figure 120 and Figure 121.

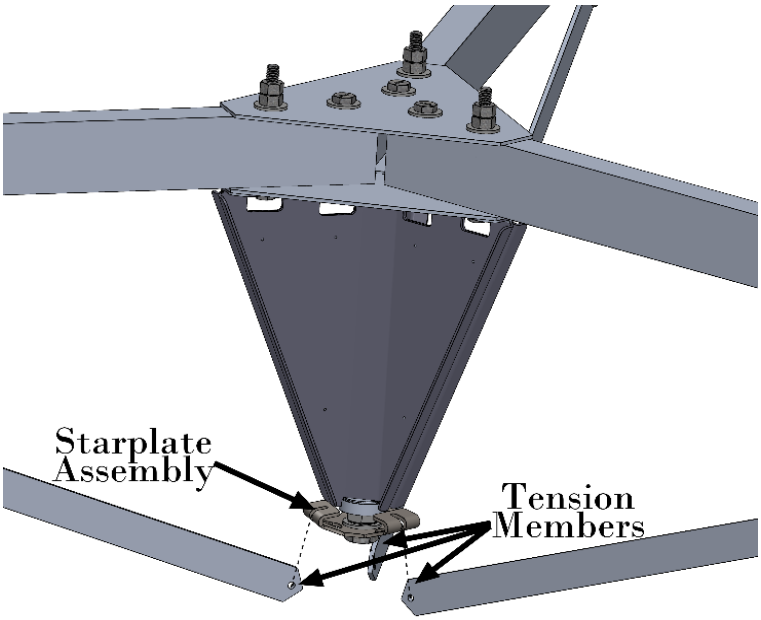


Figure 120 Tension member star plate assembly

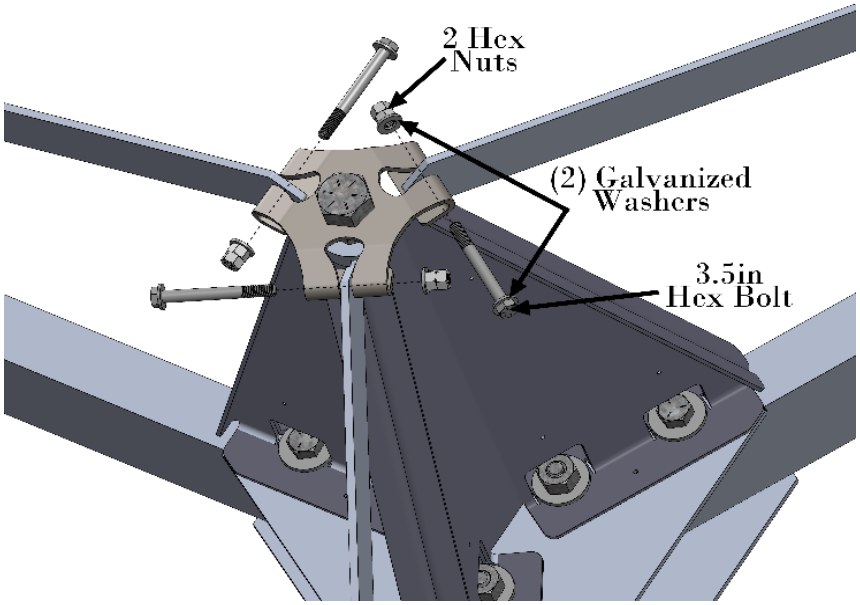


Figure 121 Tension Member assembly

4. Remove the ballast clamp U-bolts from the top ballast braces.

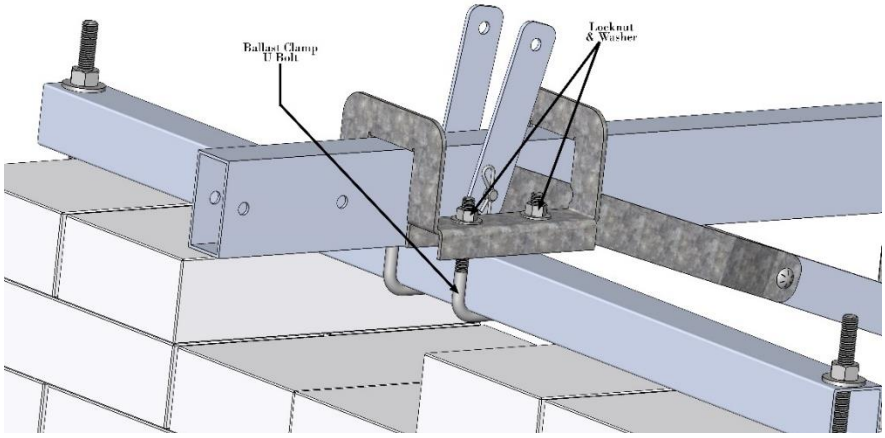


Figure 122 Ballast clamp U-bolt

5. Remove (2) 5-1/2” bolts as per Figure 123 then collapse the tower base as per Figure 124.

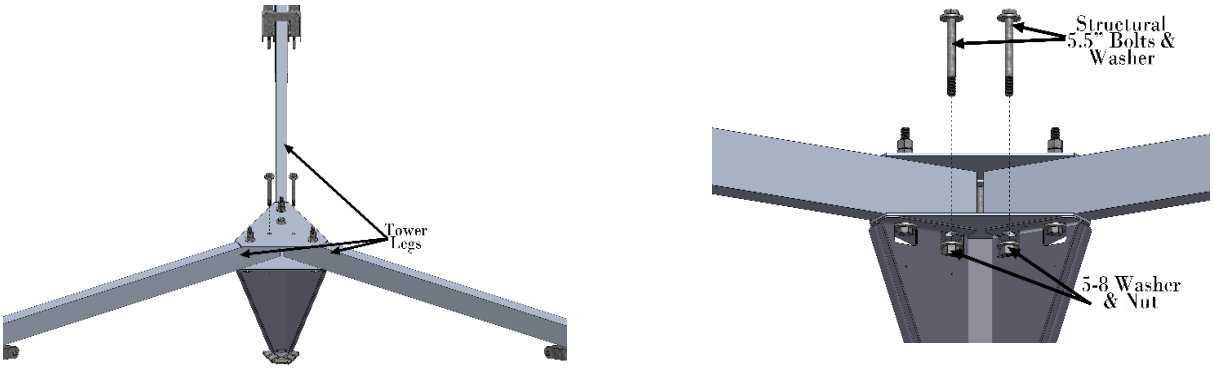


Figure 123 Tower Base

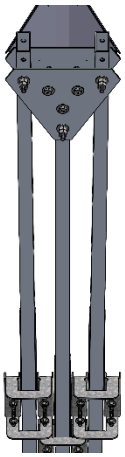


Figure 124 Colapsed tower base

6. Once fully closed, line up with the holes and reinstall the 5-1/2” bolts to secure the tower legs in closed assembly.
7. Tighten all 5-1/2” bolts and prepare for shipment.

12.8 Ballast block Disassembly

Note: Ballast block assembly may be shipped assembled if machinery is available and proper shipping is followed.

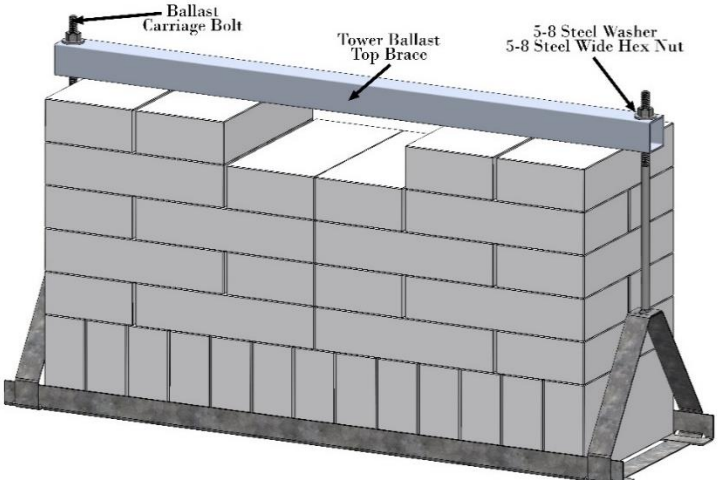


Figure 125 Ballast block assembly

1. Remove (2) 5/8” washers & (2) 5/8” nuts from the top brace on all three ballast assemblies and remove the (3) top ballast braces.
2. Remove all ballast bricks from the (3) ballast assemblies and prepare for shipment.
3. Remove the ballast carriage bolts and the tower ballast straps from each ballast frame. Prepare for shipment.

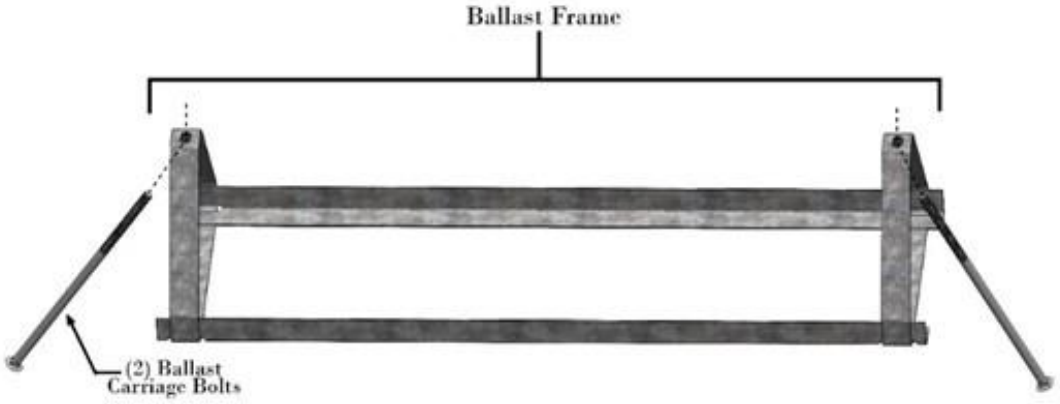


Figure 126 Ballast frame assembly

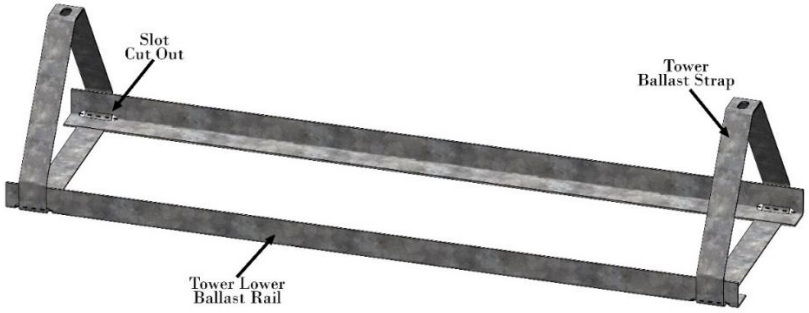


Figure 127 Tower ballast strap assembly

12.9 Camera disassembly

12.9.1 Anemometer removal

1. Remove (2) M5 x 8 mm screws from the top of the Kuva Camera.
2. Detach the anemometer from the top of the camera.
3. Reinstall the (2) M5 x 8 mm screws.

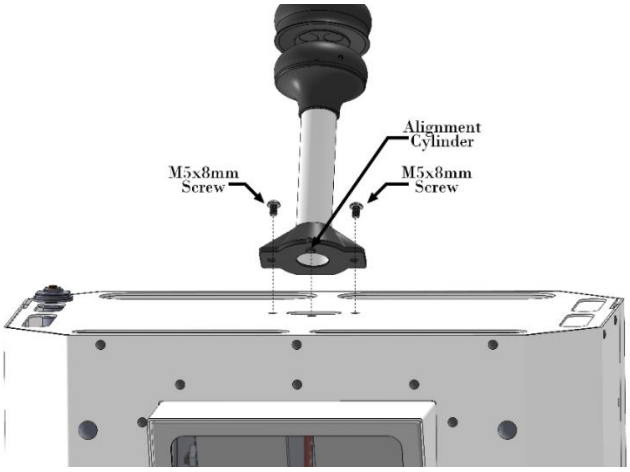


Figure 128 Removing the anemometer

Figure 129 Camera assembly with anemometer

12.9.2 Antenna

For camera models with an antenna included:

1. Turn the antenna counter clockwise and remove it. Place in the camera box.

2. Insert the GCI360 Camera into the shipping box and seal the box for shipment.

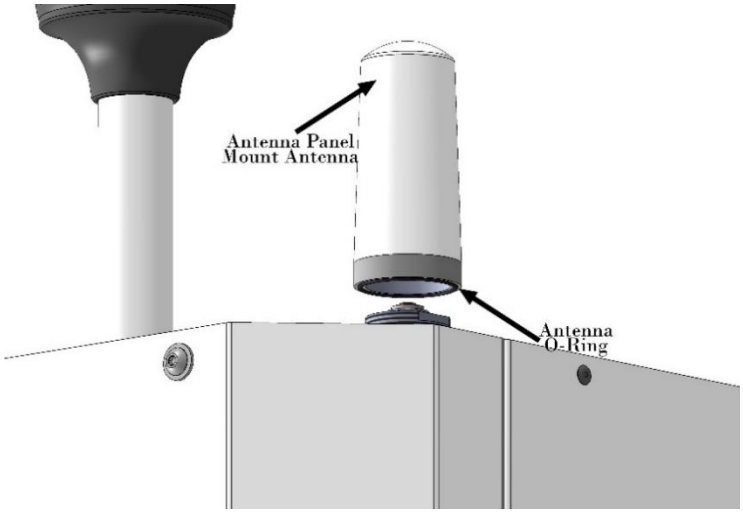


Figure 130 Seated antenna O-ring

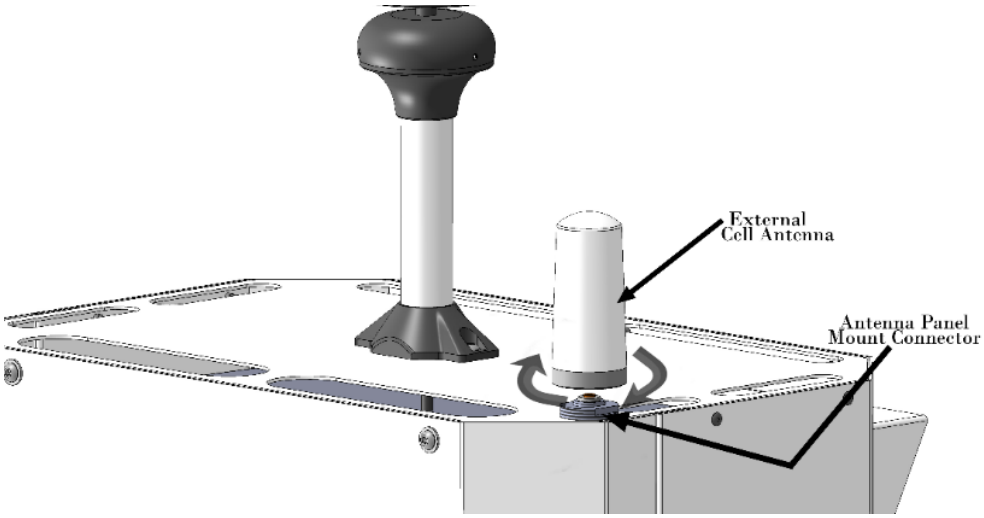


Figure 131 Antenna mounting

12.10 De-installation finalization

Place all Camera, tower and assembly components in shipping packaging.

Refer to section 14 Unboxing & uncrating for additional shipment information.

Note: It is recommend to use Kuva Systems provided packaging.

De-Installation is now complete. Clean up on site and prepare for shipment of equipment.

13 Contact Kuva Systems

Phone: (617) 925-0480
Email: info@kuvasystems.com

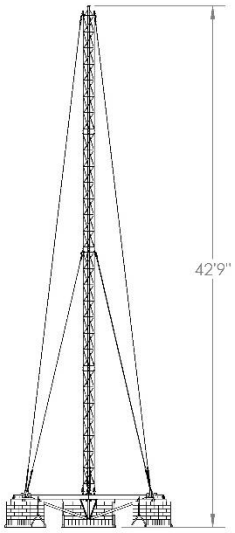
Corporate headquarters
Boston
1035 Cambridge St.
Suite 10A
Cambridge, MA 02141

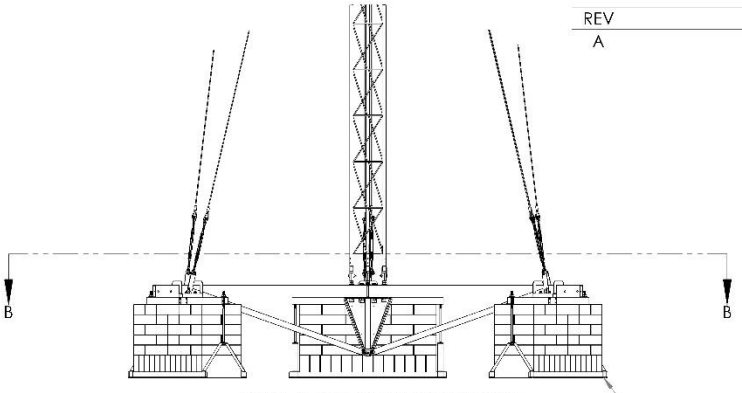
Canadian headquarters
Calgary
1006 11 Ave SW, Suite #200,
Calgary, AB
T2R 0G3

14 Appendix

REVISION HISTORY

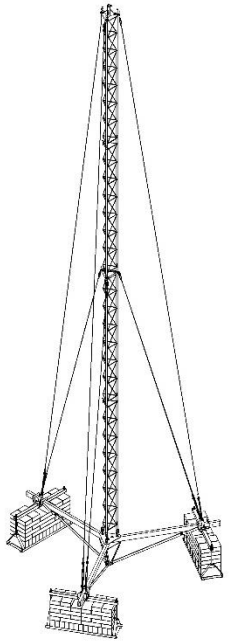
REV	DESCRIPTION	DATE	ECO #	APPROVED
A	AS DRAWN			

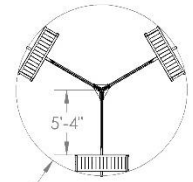




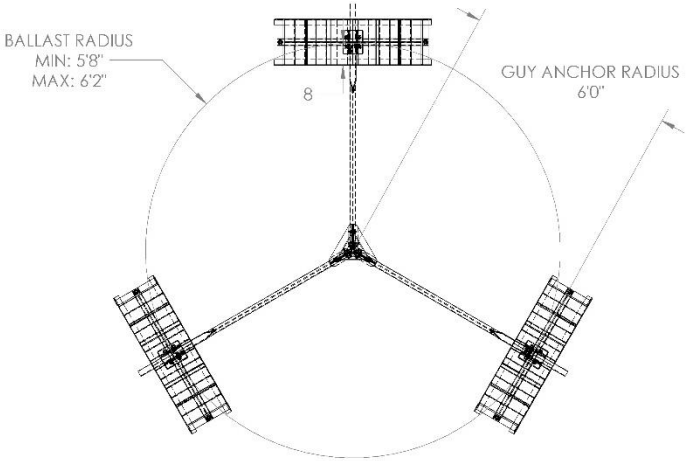
DETAIL A: BALLASTED FOUNDATION
SCALE 1 : 35

1350LB BALLAST BLOCKS





∅14'0"
TOWER FOOTPRINT



SECTION B-B: FOUNDATION TOP VIEW
SCALE 1 : 35

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. Rated to 120 mph / EPA 3sqft
2. Rated to 1" Ice Accumulation @ 40mph
3. Guy Tension: 470lb (26 on Loos Gauge PT-2 with GAC Cable)

INTERPRET PER ANSI Y14.5-2009. REFER TO PART MODEL FOR NON DIMENSIONED FEATURES.

THIRD ANGLE PROJECTION

DRAWN: Kuva

MATERIAL: See Individual Components

FINISH: See Individual Components

kuva SYSTEMS

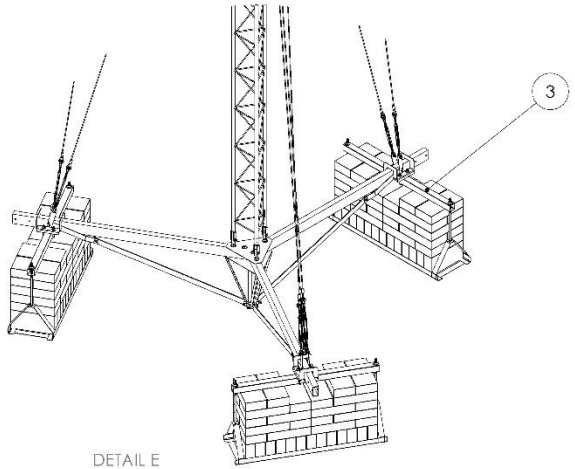
1035 Cambridge St.
Suite 10A
Cambridge, MA 02141

Installed Camera Tower - 1in Ice - Brick Ballast

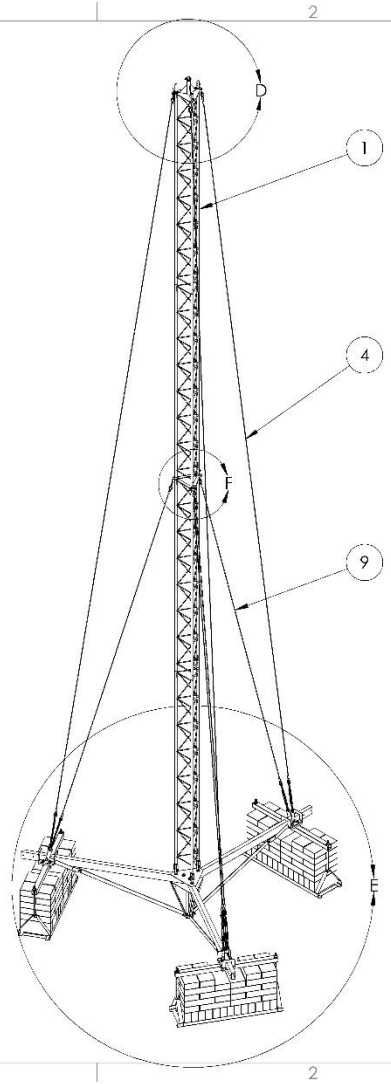
SIZE: B | DRAWING #: 040-0450-1-B | REV: A

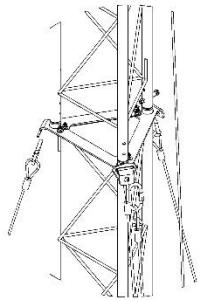
MM | SCALE: 1:100 | MODEL FILE: 040-0450 Installed Camera Tower | DXF/DWG FILE: 040-0450 Installed Camera Tower - In. CS | SHEET 1 OF 2

ITEM NO.	Part Number	DESCRIPTION	QTY.
1	120-0461	10ft Tower Section	4
2	110-0467-M	Guy Wire Turnbuckle Assembly - Mid	1
3	110-0437	Tower Brick Ballast Assembly	3
4	110-0467-T	Guy Wire Turnbuckle Assembly - Top	3
5	110-0447	Installed Camera Tower Base	1
9	110-0467-M	Guy Wire Turnbuckle Assembly - Mid	3
10	610-0707-22	Medium-Strength Grade 5 Steel Hex Head Screw	1
11	610-0725	5/16 Galvanized Washer	4
12	610-0703	Tower Guy Mount Spacer	1

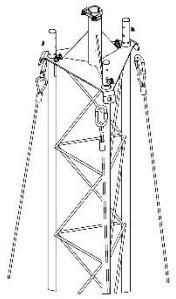


DETAIL E
SCALE 1 : 35





DETAIL F
SCALE 1 : 12



DETAIL D
SCALE 1 : 15

KUVA
GAS CLOUD IMAGING
1035 Cambridge St.
Suite 10A
Cambridge, MA 02141

Installed Camera Tower - 1in Ice - Brick Ballast

SIZE	DRAWING #	REV.
B	040-0450-1-B	A

SHEET: TITLE: 040-0450 Installed Camera Tower SHEET 2 OF 2
DWG FILE: 040-0450 Installed Camera Tower.slddrw

15 Solar Panel Documentation

Insert Solar Panel Documentation here