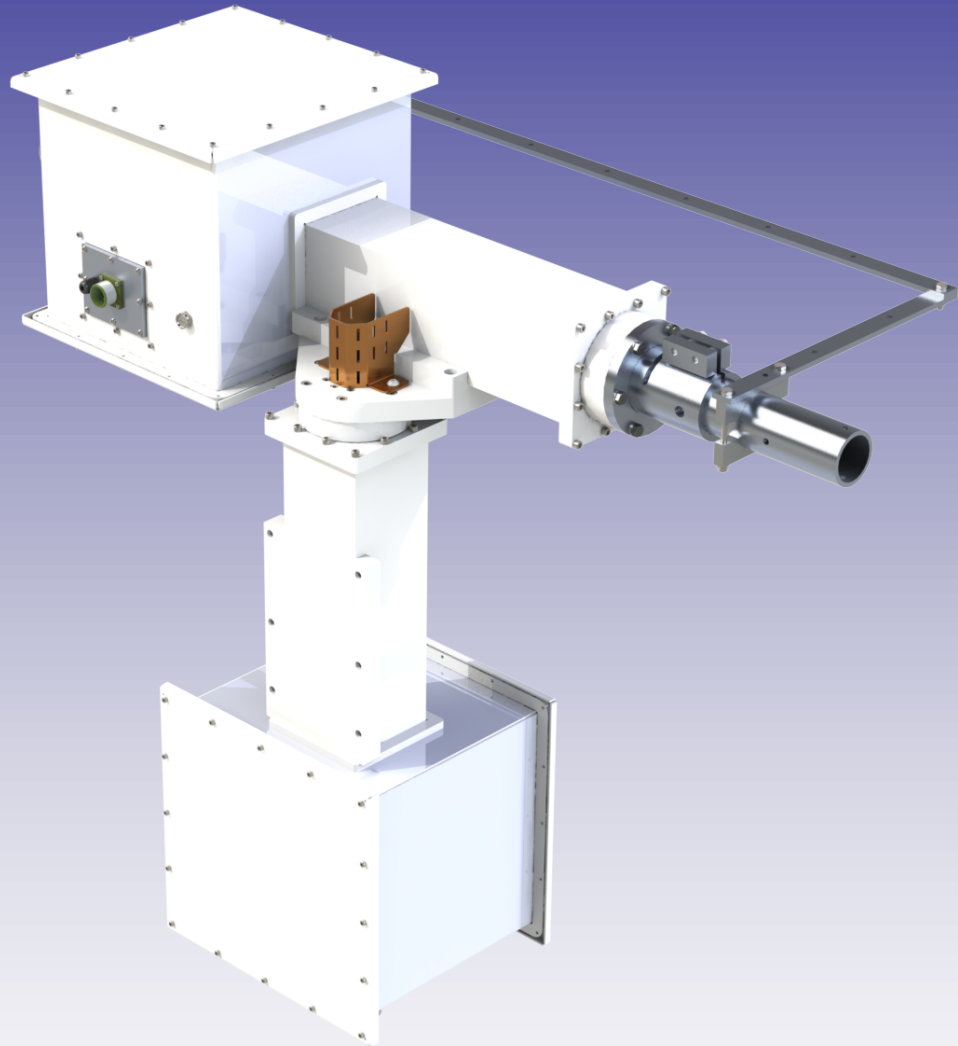




M2 Antenna Systems, Inc.

Model No: FGAE1000-D1-W-COS-A-H



SPECIFICATIONS:

Model FGAE1000-D1-W-C-A-H
Motor Type DC Motor
Worm Gear Configuration Single
Enclosure Type Weatherproof

Mount Style Cross Boom
Body Material Aluminum
Environment Control Heater

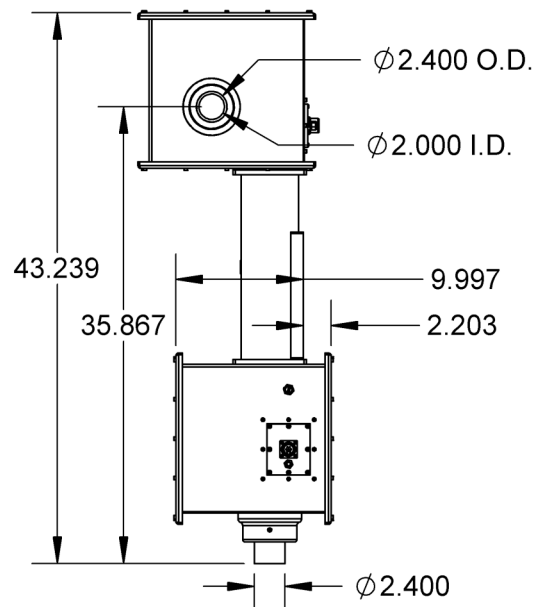
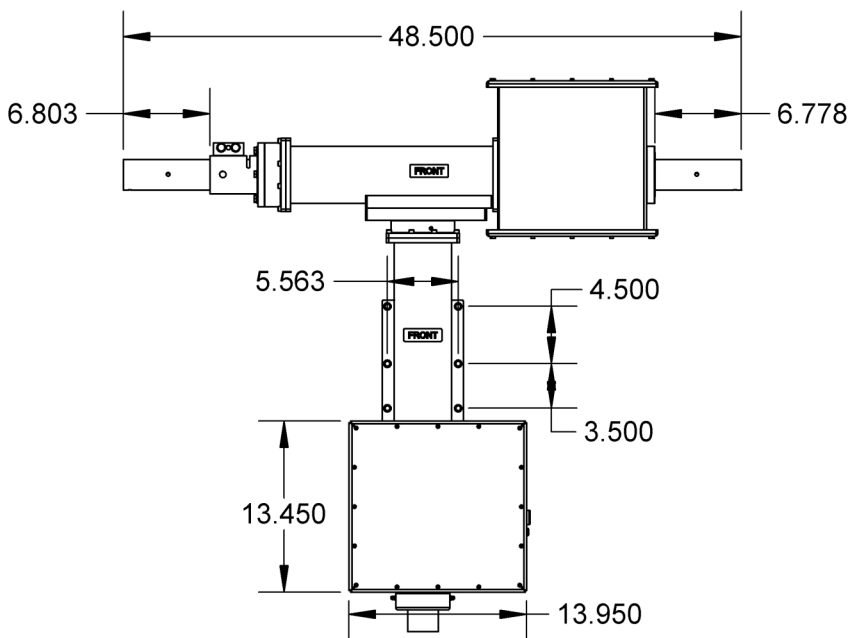
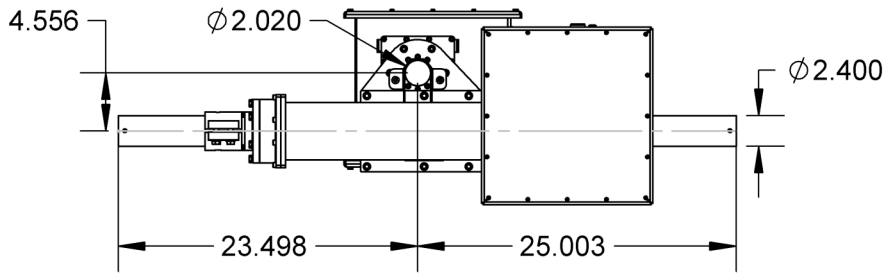
SYSTEM OVERVIEW & DIMENSIONS

BEFORE YOU BEGIN: Look over all the DRAWINGS to get familiar with the various parts and assemblies in the system. Tools handy for assembly process: screwdriver, 11/32, 7/16, 1/2, 9/16 and 5/8" spin-tites, end wrenches and/or sockets, measuring tape.

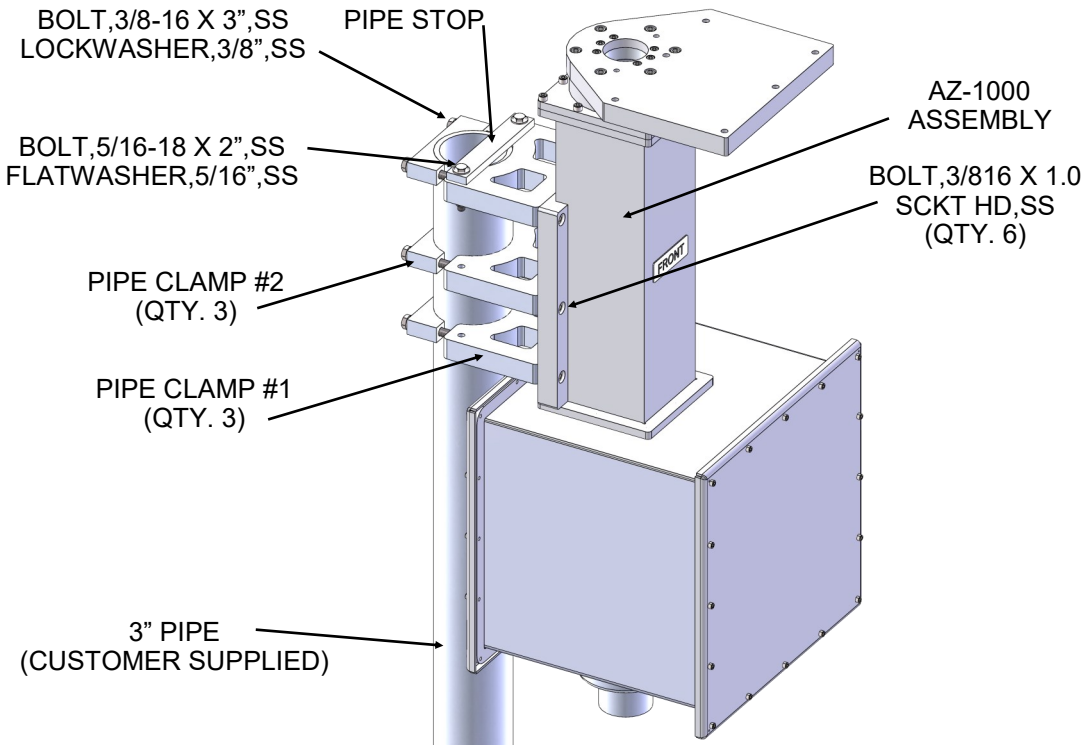
Note:

All installations are unique in some way, which means it's OK to preassemble certain hardware, or rearrange the assembly process to meet specific site requirements. A quick review of the assembly notes and drawings should help firm up the appropriate strategy. Please remember to double-check all hardware for tightness BEFORE it becomes inaccessible.

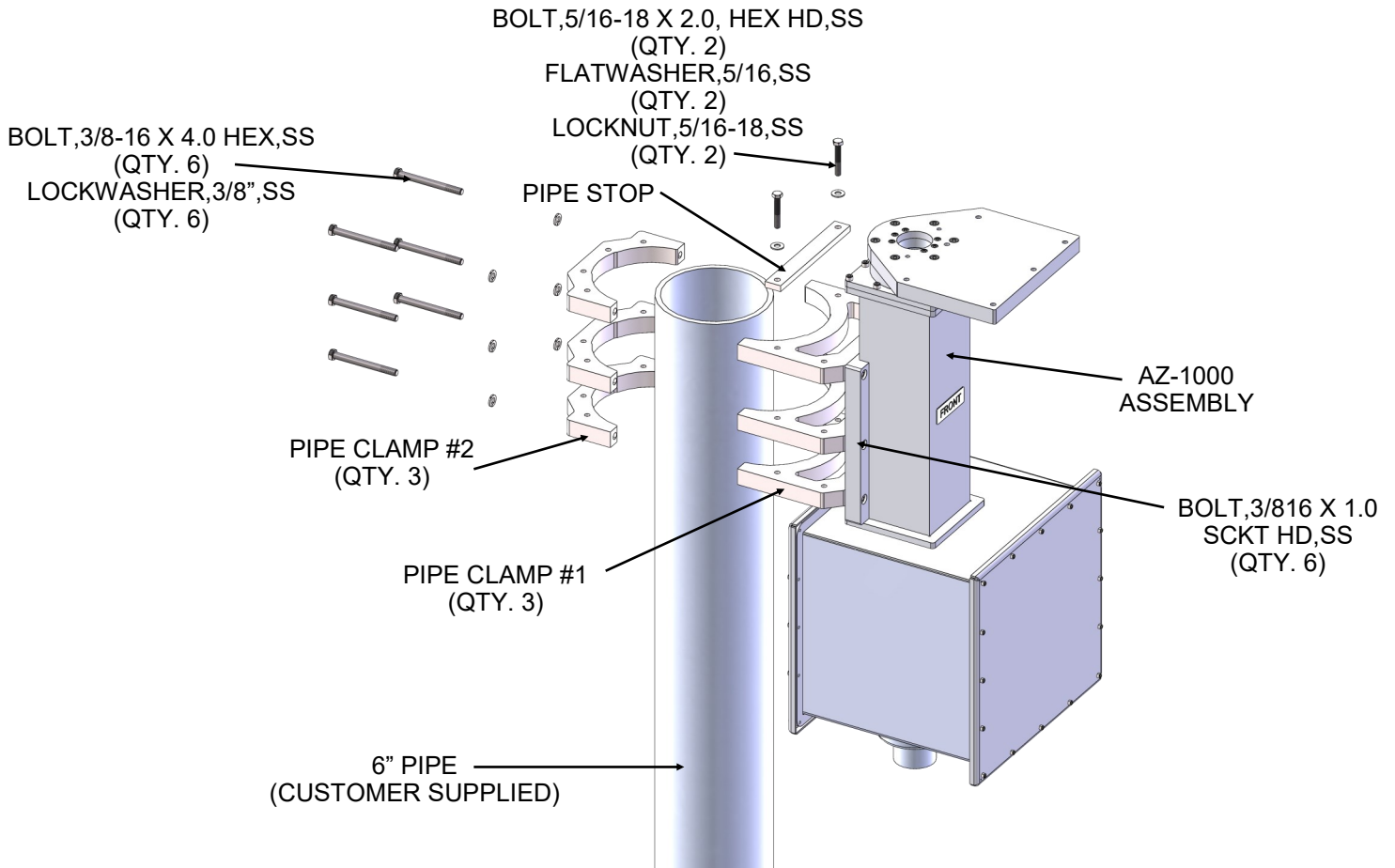
Two containers of zinc paste (Penetrox, Noalox, or equiv.) have been provided to enhance and maintain the quality of all electrical junctions on this system. Apply a thin coat wherever two pieces of aluminum come in contact or any other electrical connections are made. It is also useful on screws and bolt threads as an ANTI SEIZE compound.



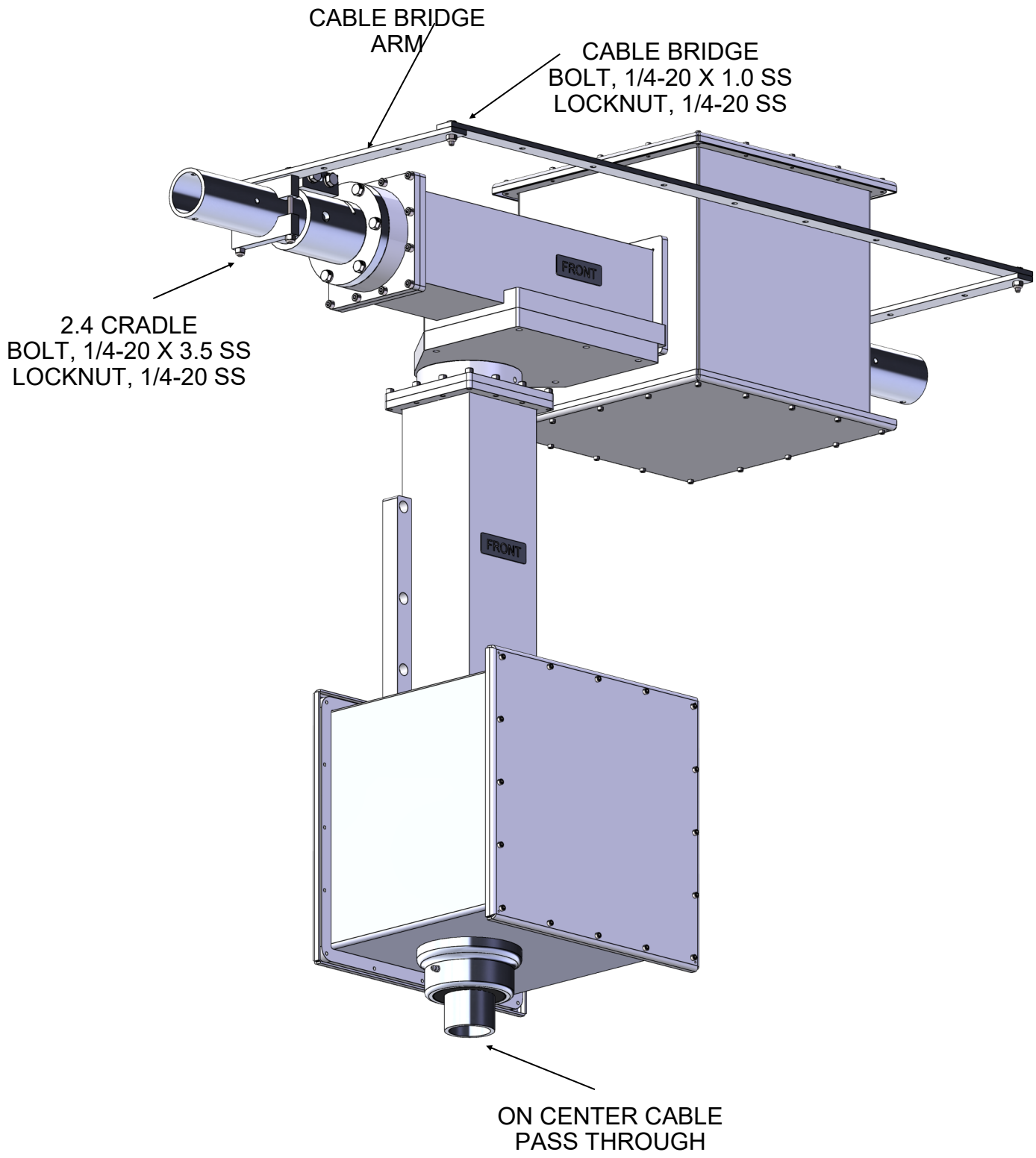
3" PIPE CLAMPS (OPTIONAL)



6" PIPE CLAMPS (OPTIONAL)

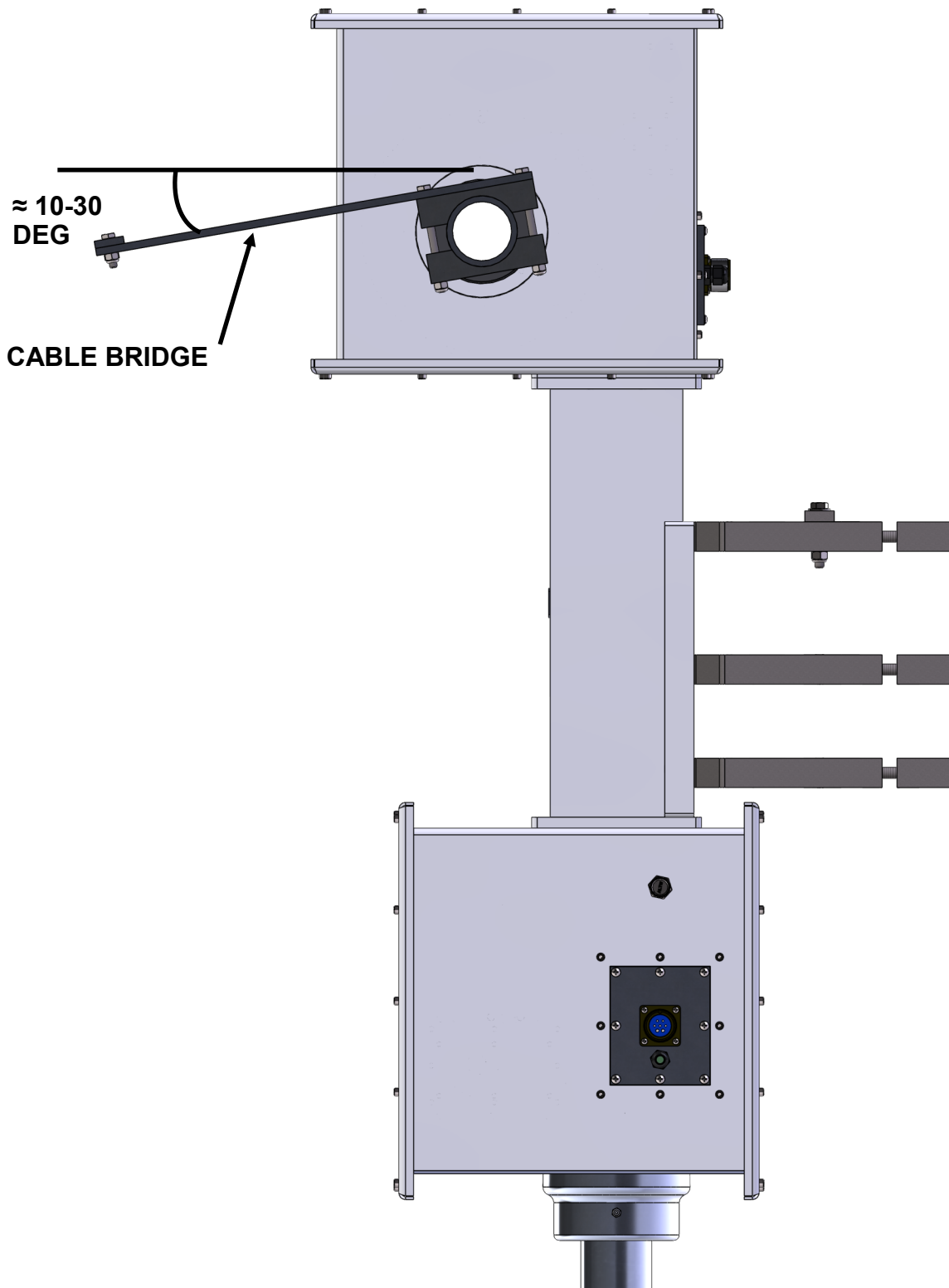


FGAE1000-D1-W-COS-A-H ASSEMBLY



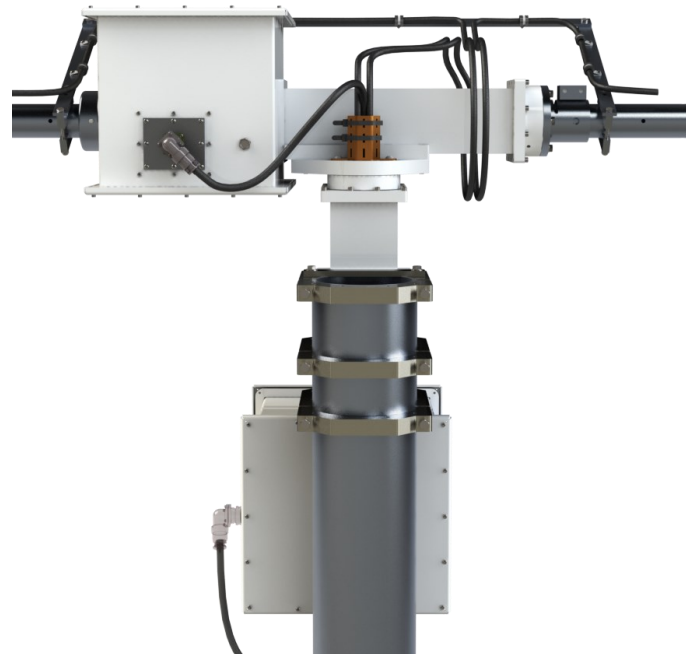
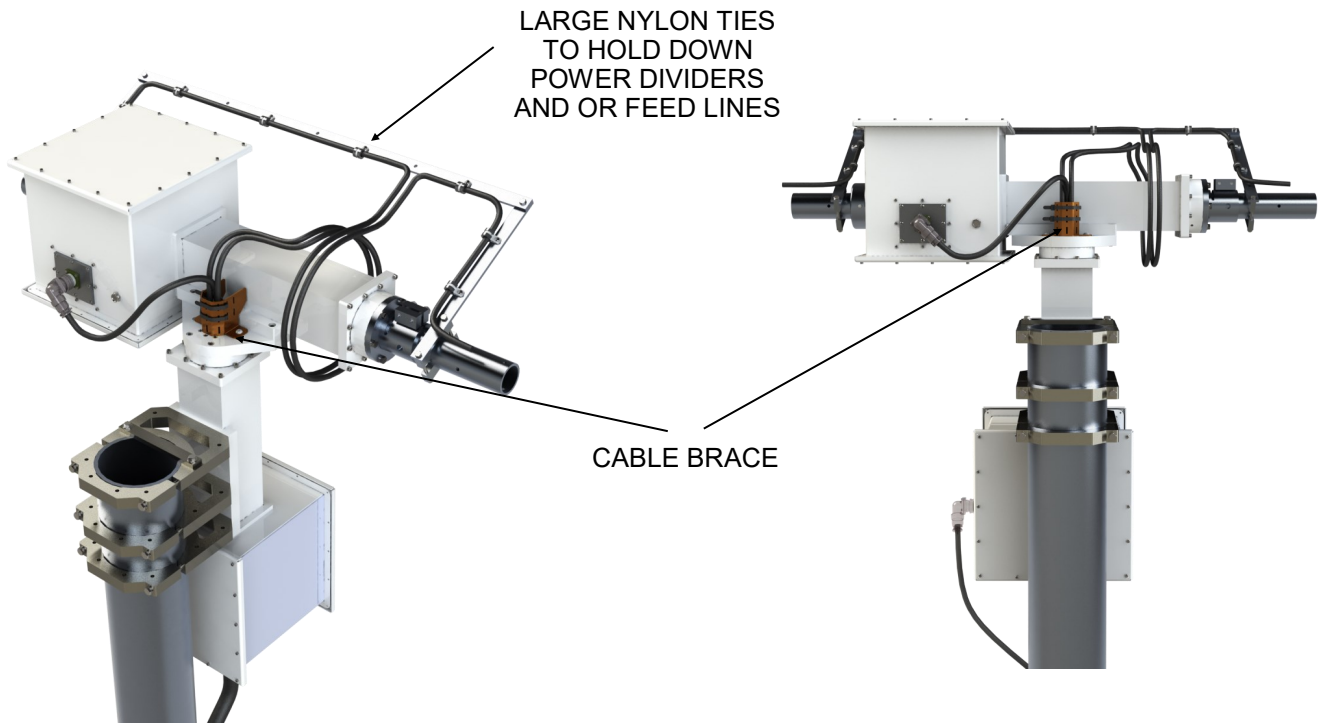
FGAE1000-D1-W-COS-A-H ASSEMBLY

NOTE: When using 180 degrees over the top elevation movement during tracking, the cable bridge can collide with the cable routing bar and associated cables. When mounting the cable bridge, be sure the elevation system is on the horizon, then position the cable bridge 10-30 degrees below the horizon to avoid collision with the cable routing bar. Confirm clearance before any un-manned operations.



CABLE ROUTING

The new AE1000-D1-W-COS-A-N helps to simplify the cable routing process by allowing the cable to pass through the Azimuth axis. This simple change can save on costly repairs when cable get snagged keeping the system from performing.



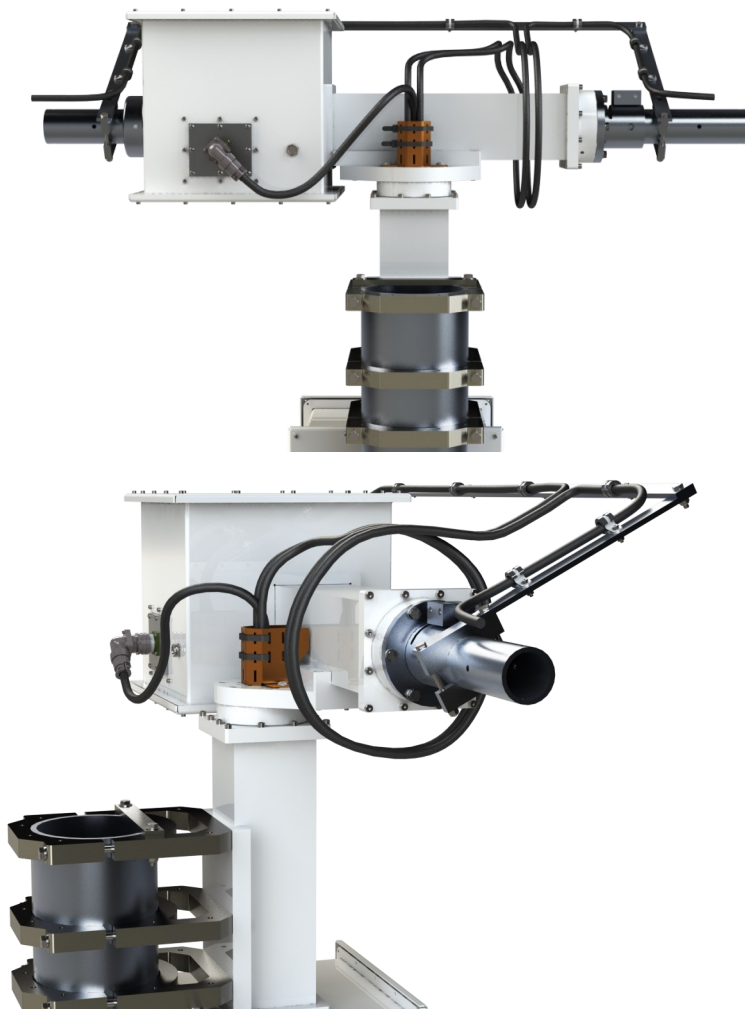
CABLE ROUTING

Note: When cable routing, each axis should be positioned at the centers of each travel spectrum. Az: If your AZ is set for south center, then position the AZ at 180 deg. EL: if your EL is set for 0 to 90 deg. The set your EL for 45 deg. This way the cables will only need to flex for 1/2 of the total movement on each direction of rotation.

Elevation Loop

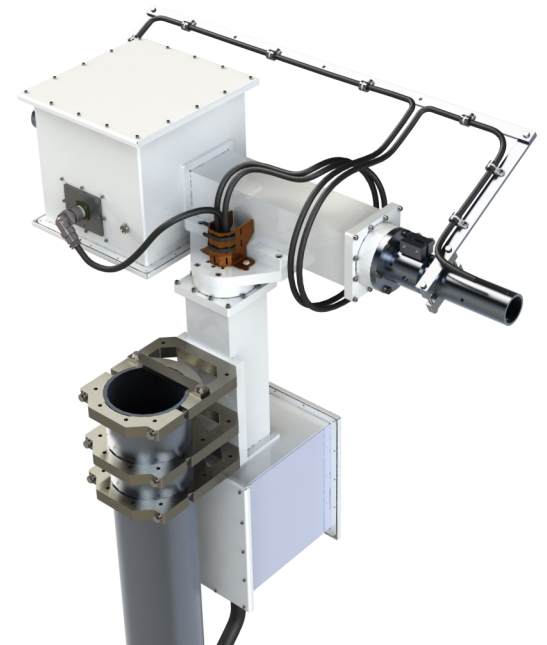
The Elevation axis control cable comes up through the AZ assembly cable pass through and attaches to the elevation motor unit. Note the RF cables from the antennas come from either side of the H-Frame and onto the cable bridge then they should loop around the Elevation axis body then down through the cable pass through. The loop around the Elevation body will provide a loop that will expand and contract as the elevation moves up or down in rotation. Temporarily use electrical tape or nylon ties to hold the cables together and to the cable brace. Drive the Elevation axis to both ends of the travel and watch the cables to be sure they do not become too tight or get hung up. Make adjustments as needed, this may take multiple passes to feel comfortable with the cable rap and cable loop. Once you feel comfortable with the cable rap and its movement add nylon ties to the cable brace. Note: multiple slots have been added to the cable brace to give adequate positions for small and large cable bundles. Taping or the use of nylon tie to keep the bundle together below the cable pass through is recommended

LARGE NYLON TIES
TO HOLD DOWN
POWER DIVIDERS
AND OR FEED LINES



NOTE:
GENERIC POWER DIVIDER
BRIDGE SHOWN FOR
CABLE ROUTE EXAMPLE.

POWER DIVIDER BRIDGE
SETUP MAY BE DIFFERENT.
REFER TO MASTER SYSTEM
MANUAL FOR MORE DETAILS.



CABLE ROUTE FLAG & BRIDGE

AZ Cable Route

The Azimuth axis control cable simply attaches to the AZ axis then loops down and back to the full cable bundle coming from the bottom of the cable pass through 6 to 12 inches below the exit of the pass through. Taping or the use of nylon tie to keep the lower main cable bundle together below the cable pass through is recommended.



FGAE1000-D1-W-C-A-H PARTS & HARDWARE

<u>DESCRIPTION</u>	<u>QTY</u>
AE1000 ELEVATION ASSEMBLY (SAAE1948)	1
AE1000 AZIMUTH ASSEMBLY (SAAE1926)	1
7 PIN FEMALE RIGHT ANGLE CONNECTOR ASSEMBLY	2
CABLE BRACE (M2AAE1928)	1
CABLE BRIDGE ARM (M2AAE1617)	2
CABLE BRIDGE (M2AAE1618)	1
2.4" CRADLE (M2AMC0128)	4
PENETROX OR ZINC PASTE (1 OZ. CUP)	1
NYLON TIE, 12"	10
NYLON TIE, 7"	10
DESICCANT BAG	2

HARDWARE

BOLT, 3/8-16 X 1.0", SOCKET HEAD, S.S.	11
BOLT, 3/8-16 X 3/4", SOCKET HEAD, S.S.	1
BOLT, 5/6-18 X 1/2", SOCKET HEAD, SS	2
BOLT, 1/4-20 X 3.5" HEX HEAD S.S.	4
BOLT, 1/4-20 X 1.0" HEX HEAD S.S.	2
LOCK NUT, 1/4-20, S.S.	6
SCREW, 8-32 X 1/2", SET, S.S.	4
ALLEN KEY, 5/64"	1

OPTIONAL KITS

PIPE MOUNT KIT, 3" (FGAEPMK3)

<u>DESCRIPTION</u>	<u>QTY</u>
3" PIPE CLAMP (M2AMC0144)	3
3" PIPE CLAMP CAP (M2AMC0149)	3
3" PIPE STOP (M2AAE1608)	1

HARDWARE

BOLT, 3/8-16 X 3", HEX HEAD, S.S.	6
LOCK WASHER, 3/8", S.S.	6
BOLT, 5/16-18 X 2", HEX HEAD, S.S.	2
FLAT WASHER, 5/16", S.S.	2
LOCK NUT, 5/16-18, S.S.	2

PIPE MOUNT KIT, 6" (FGAEPMK6)

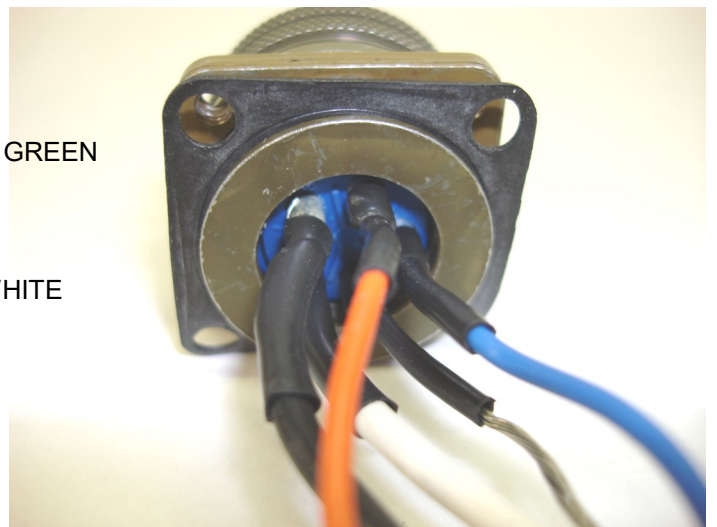
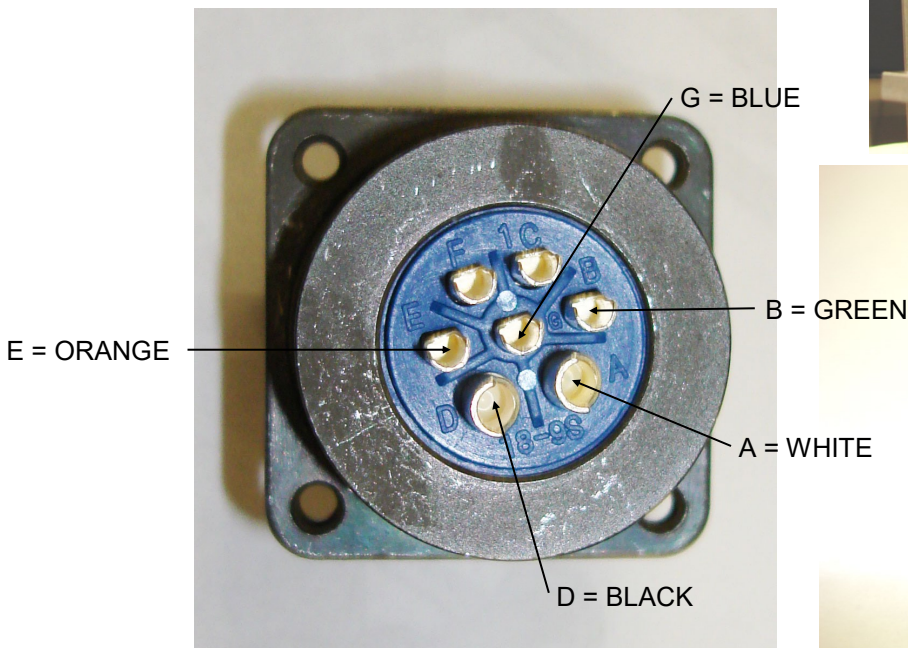
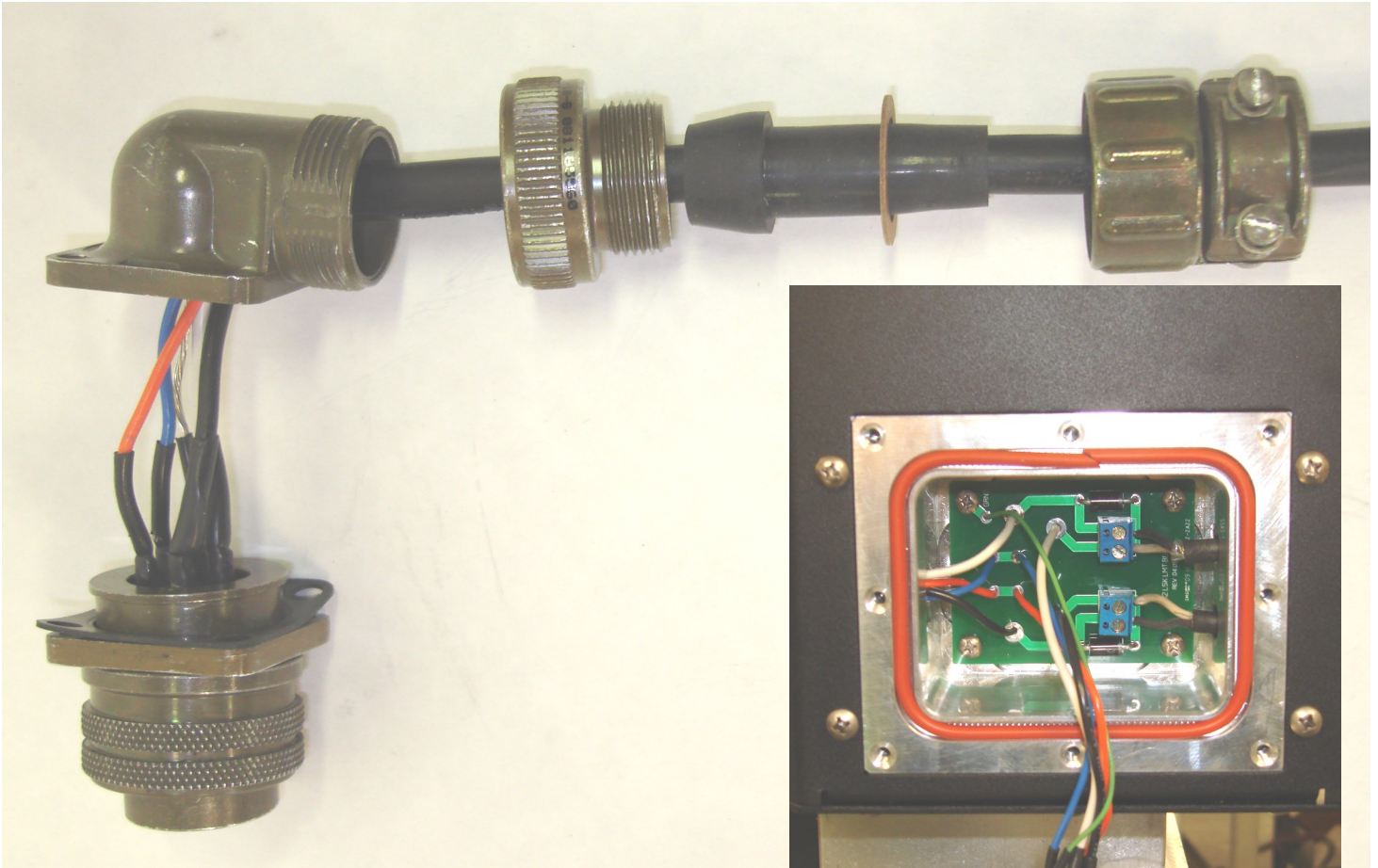
<u>DESCRIPTION</u>	<u>QTY</u>
6" Pipe Clamp #1 (M2AMC0143)	3
6" Pipe Clamp #2 (M2AMC0142)	3
6" Pipe Stop (M2AAE1606)	1

HARDWARE

Bolt, 3/8-16 x 4", Hex Head S.S.	6
Lock Washer, 3/8" S.S.	6
Bolt, 5/16-18 x 2", Hex Head S.S.	2
Flat Washer, 5/16", S.S.	2
Lock Nut, 5/16-18, S.S.	2

AZ/EL JUNCTION BLOCK CONNECTIONS

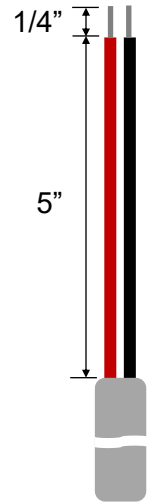
The pictures on this page shows the standard wiring in the junction boxes (with switch reversing diodes) & 7 pin female right angle connector assembly. The system works the following way: Current is constant through the limit switches and through to the positioner. When the limit switch is activated, it breaks the contact and stops the current from continuing. Reversing the positioner in the opposite direction, incorporates directional diodes. Because this is a standard wiring system, there may be variations to this system that may be changed by your specific orientation of each Axis.



HEATER UNIT CONNECTIONS

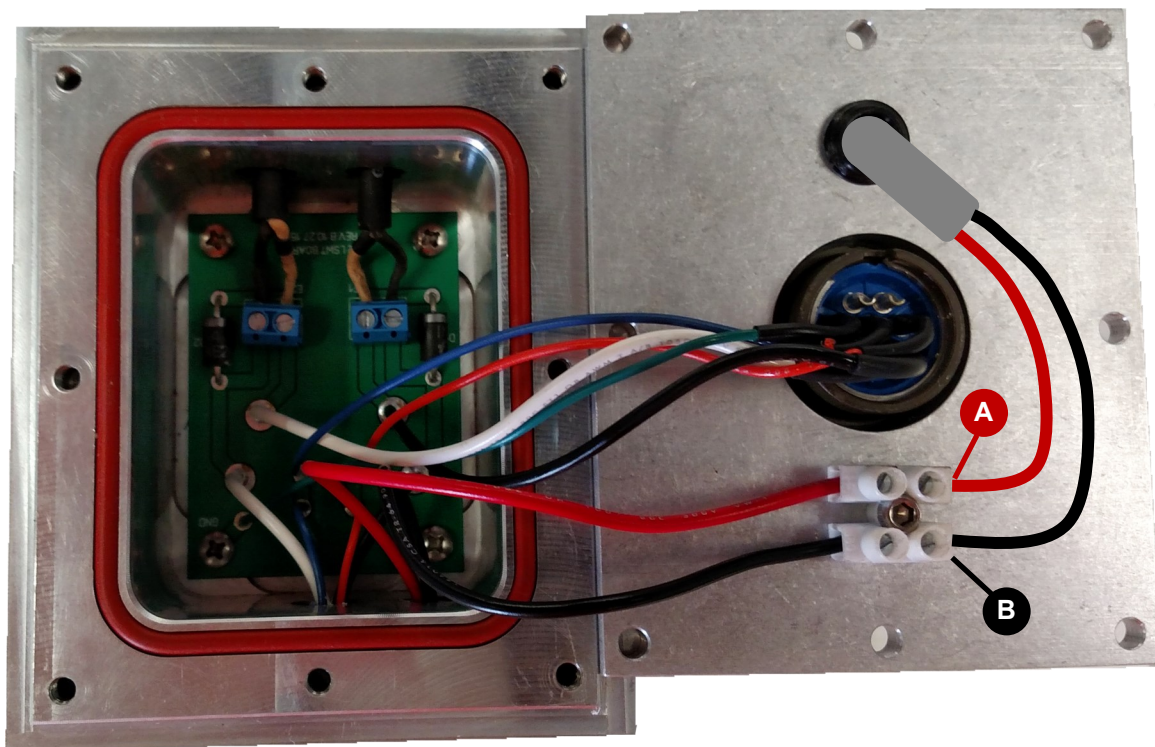


Remove the (8) 8-32 screws from the front limit switch panel.



Prepare the provided 2-Conductor Red & Black 16AWG wire. Remove (5-1/4") of the outer grey jacket. Strip (1/4") of insulation from both the Red & Black wires as shown.

Slide the prepared 2-Conductor Red & Black 16AWG wire through the cord grip from the front of the panel. Route the Red wire to position "A" as shown below. Then route the Black wire to position "B" as shown below. Tighten small flathead screws on the terminal strip. Place the front panel onto the LSK enclosure and reinstall the (8) 8-32 screws. Tighten the cord grip nut on the front of the panel.



AZ/EL PHYSICAL LIMIT SWITCH TEST

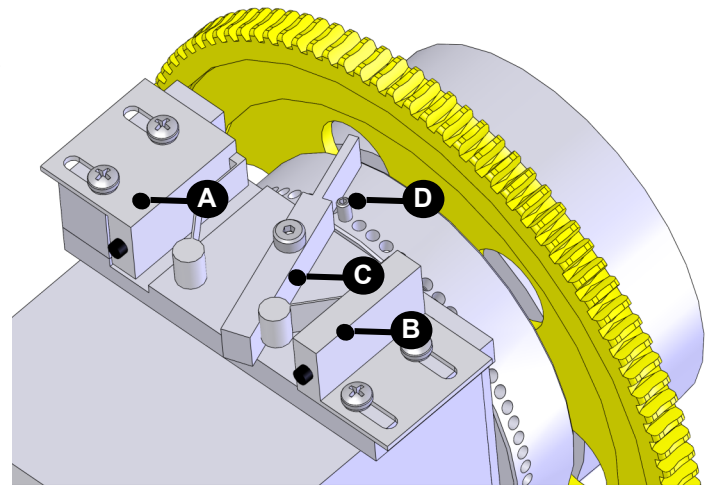
LSK-1000 OVERVIEW:

The **LSK-1000** limit switch kit is a physical hard backup limit. The standard control unit supplied with our AZ or EL has “**Electronic Limits**”, but the **LSK-1000** limit switch kit, has been designed as a physical backup system in the event of a control unit failure. The factory has pre-installed the **LSK-1000** limit switch kit into the AZ and EL units for you. Typically the **LSK-1000** limit switches only need to be setup once, but can be adjusted when necessary.

LSK-1000 MANUAL LIMIT SWITCH PRE-TEST:

Remove one half of the black enclosure from the positioner unit that **DOES NOT** have cord grips or wires running into it. You will see the limit switches (**A,B**) the limit arm (**C**), and limit screw (**D**) as pictured to the right. **We have not installed the limit screw due to unknown customer orientation.** Move the supplied **RC2800** control unit near the positioner for proper limit switch testing. With the positioner wired to the control unit, turn the control unit on. Be sure to test the proper direction of each positioner before moving forward. Once you have determined the correct direction of rotation from the control units’ “Control Buttons,” determine which limit switch will be activated by the rotation of the main gear and limit screw. Press a known direction using the “Control Buttons,” and manually activate the limit switch. At this point the positioner should stop it’s travel. Continue holding the limit switch and reverse the direction using the “Control Buttons.” The motor should move away from the engaged limit switch. This confirms proper wiring and operation of the limit switch. Repeat this procedure for the other direction and limit switch. We suggest, completing each axis (ie Azimuth and Elevation) prior to moving onto the final setup.

AZ/ EL-1000 LIMIT SWITCH ARRANGEMENT



FINAL SETUP OF THE LIMIT SET SCREWS:

We have included (2) limit screws, one for each limit switch. The limit screws can be setup at any position based upon the orientation of your choice. On Azimuth and Elevation use the supplied 8-32 x 1/2” set screws and 5/64 allen wrench. **DO NOT INSTALL AT THIS TIME.** You can always make slight adjustments to the limit screw if necessary. We have provided adjustment holes at every 5°. We suggest leaving the cover off of the unit until you have completed your testing.

MAINTENANCE INFORMATION

90 day maintenance

1. Visual inspection of complete system, look for rust or corrosion and loose hardware.
2. Manually move each axis individually and LISTEN for smooth operation.
3. Check cables for wear and cracking.
4. Check each axis for physical looseness and or backlash (adjust if necessary).
5. Remove covers, check and clean any excessive foreign debris.
6. Grease main gear and worm gear.
7. Check for proper operation of each axis.
8. Replace covers. The use of silicone grease on the O-ring seals is recommended

1 year maintenance

1. Visual inspection of complete system, look for rust or corrosion and loose hardware.
2. Manually move each axis individually and LISTEN for smooth operation.
3. Check cables for wear and cracking.
4. Check each axis for physical looseness and or backlash (adjust if necessary).
5. Remove covers, check and clean any excessive foreign debris.
6. Check AZ-1000 and EL-1000, thrust block oil-light bearings for wear.
7. Check main load bearings for each individual axis and look for radial slop and or bearing binding.
8. Grease main gear and worm gear.
9. Check physical limit switch operation.
10. Check for proper operation of each axis.
11. Replace covers. The use of silicone grease on the O-ring seals is recommended

TROUBLESHOOTING

Troubleshooting

1. Motors not moving.

- A. Check for voltage coming out of control box.
- B. Check for voltage at motor (**AZ / EL=42 VDC**).
- C. Check all wiring from control box to motor.
- D. Check motor for binding.

2. No pulse from motors.

- A. Check all wiring from reed switch to control box.
- B. Replace reed switch.

3. Gear binding.

- A. Check Gears for Grease.
- B. Check gear bolts for looseness.
- C. Check gears for foreign debris.
- D. Adjust thrust block adjustment.

4. Excess backlash

- A. Inspect worm and worm gear for wear.
- B. Inspect for thrust block bearing wear.
- C. Inspect system for loose hardware.
- D. Adjust thrust block adjustment.

5. Excess 3" bearing movement

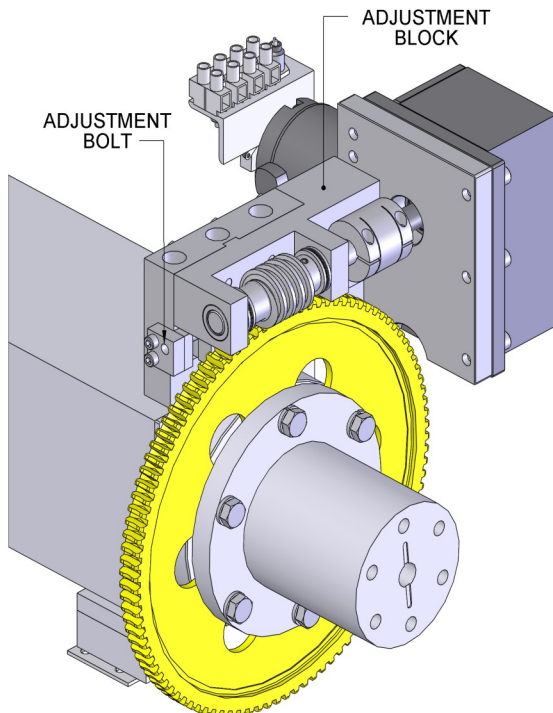
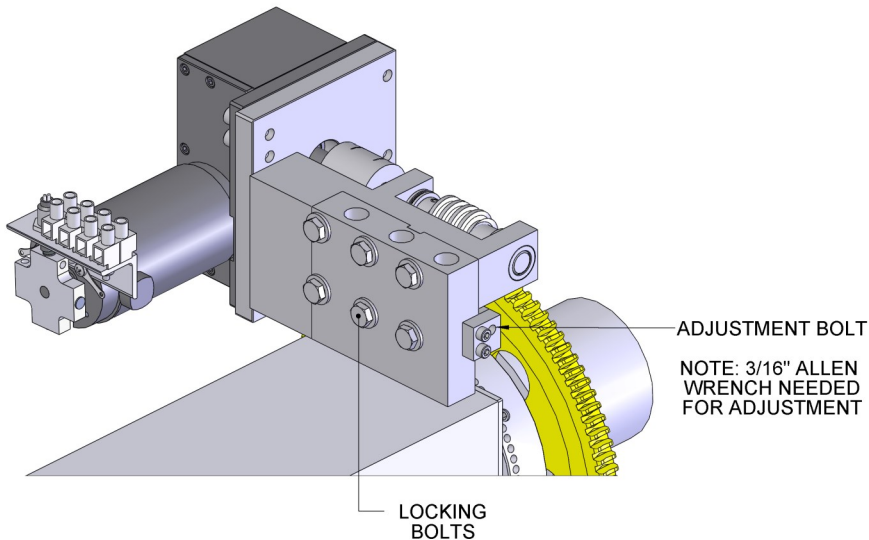
- A. Inspect bearing for radial movement.
- B. Replace 3" bearing assembly.

6. 3" Bearing Binding

- A. Disassemble bearing assembly and inspect for lubrication and foreign debris. Reassemble and test. Replace if necessary.

For more complete maintenance and technical assistance, please contact M2 Antenna Systems, Inc. at **(559) 432-8873**.

WORM & WORMGEAR ADJUSTMENT



NOTE:
SOME PARTS ARE NOT SHOWN FOR CLARITY

Excessive backlash may develop after using system for some time. We have incorporated a built in backlash adjustment block to keep backlash at a minimum.

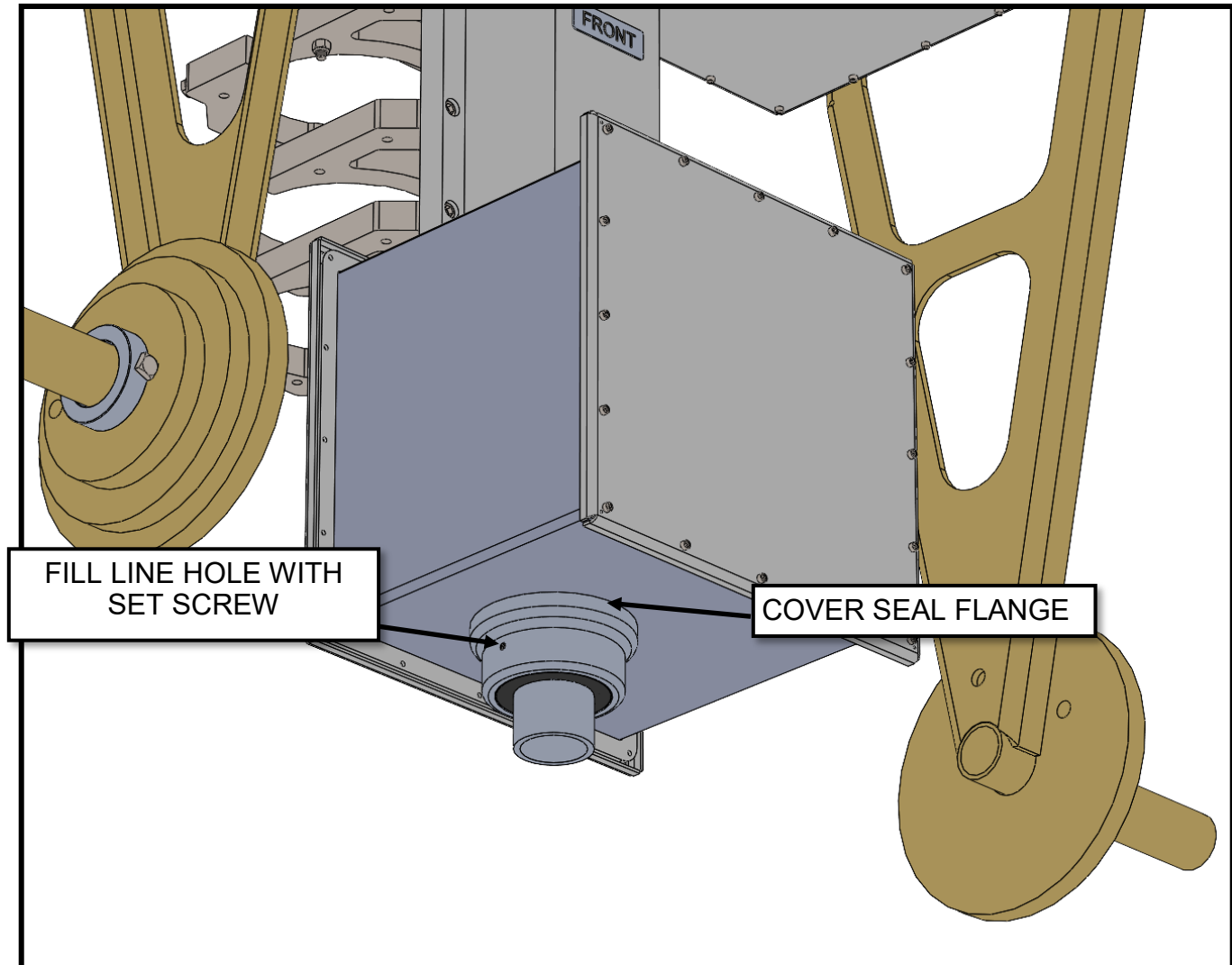
Please review drawings shown for more detailed information.

To adjust system:

1. Slightly loosen locking bolts to hand tight.
 2. Use a 3/16" Allen wrench to turn adjustment bolt.
 3. One full turn of the adjustment bolt will move adjustment block 0.010 of an inch.
 4. Clockwise rotation of the adjustment bolt will move the adjustment block down, moving the worm closer to the worm gear and removing backlash.
 5. Counter clockwise rotation of the adjustment bolt will move the adjustment block up, moving the worm away from the worm gear and creating more backlash.
 6. Adjustments should be made with the motor running. Use the motor drive sound as gauge for friction between worm and worm gear.
- Note:** To much friction may cause gear binding in rarely used sections of the worm gear. Some finesse maybe required.
7. Tighten locking bolts and test system. Listen for motor running sound for smooth system operation and minimal backlash.

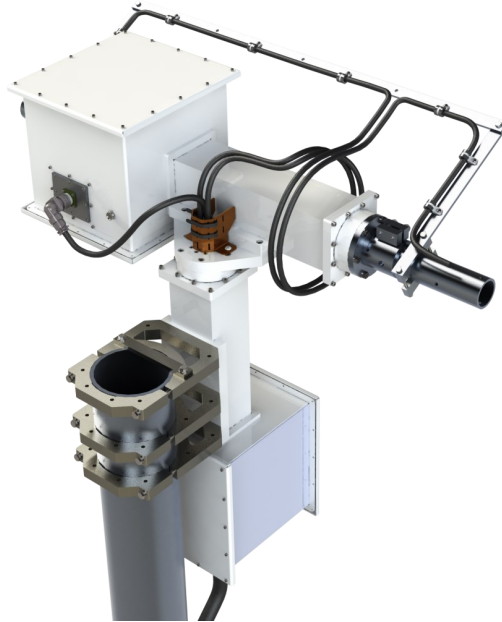
COVER SEAL FLANGE MAINTENANCE

COVER SEAL FLANGE is used in multiple locations on the AE1000 positioner series depending on the model purchased. The SEAL comes pre-greased from the factory with LUBRIPLATE MAG -1. The SEAL may need to be refilled from time to time based on installation environment or usage. This grease should be inspected and maintained bi-annually.



1. Remove SET SCREW to prevent excess pressure during insertion of new grease. Insert new grease into ZERK fitting opposite to SET SCREW.
2. Pump grease into SEAL until a consistent stream of GREASE spills out of hole.
3. Once GREASE can be seen re-insert SET SCREW. CAREFUL not to overfill SEAL as excess pressure can blow SEAL.
4. Tighten SET SCREW until flush with aluminum housing.

12 Month Limited Warranty Information



This warranty gives you specific legal rights. You may also have other rights which will vary from state to state or province to province.

M2 warrants the **2-Axis** Positioner unit against defects in material and workmanship for a **period of 12 months** from date of purchase. During the warranty period, **M2** will, at its option, either repair or replace products or components which prove to be defective. The warranty shall not apply to defects or damage resulting from:

- Improper or inadequate maintenance by user
- Improperly prepared installation site
- Unauthorized modifications or misuse
- Accident, abuse, or misapplication
- Normal wear

M2 specifically does not warrant this product for any direct, indirect, consequential, or incidental damages arising from the use or inability to use the product. Some states or provinces do not allow the exclusion or limitation of liability for consequential or incidental damages so the above limitation may not apply.

In the event repair or replacement are necessary, purchaser shall contact **M2** for return authorization. In many cases this contact can simplify and expedite the repair / replacement process and help reduce costs and downtime.

The purchaser shall be responsible for packing the product properly for return and for charges to ship the product to **M2**. Always include with the shipment, a statement detailing the problem / failure and any other pertinent observations. Insuring the product for shipment is recommended. Use the original packing materials whenever possible. **M2** is responsible for charges (**in the United States**) to return the repaired / replacement product only where warranty service is involved.

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(559) 432-8873 Fax (559) 432-3059 Web: www.m2inc.com