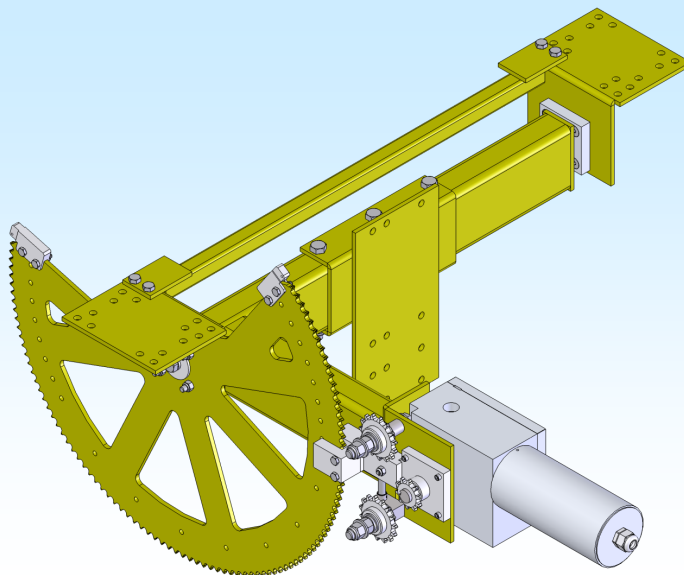




# M2 Antenna Systems, Inc.

## Model No: MT-3000A



### SPECIFICATIONS

MODEL NUMBER.....	MT-3000A (Elevation Positioner)
ROTATING TORQUE .....	4500 Inch lbs. (at slowest speed)
GEAR RATIO .....	19200:1
ROTATION SPEED / 0-90 DEGREES .....	35 Seconds (Speed Controlled)
ROTATION RANGE.....	0-180 Degrees
READOUT RESOLUTION .....	0.1 Degrees
TRAVEL ACCURACY .....	+/- .5 Degrees
INPUT VOLTAGE. ....	28-42 VDC
DIMENSIONS .....	W=30" / H=12" / D=30"
FINISH .....	Gold Zinc
CABLE REQUIREMENTS .....	(2) #16AWG, (2) #22AWG Shielded
WEIGHT .....	97 lbs.

# MT-3000A PRE ASSEMBLY NOTES

**FOR A SUCCESSFUL INSTALLATION THERE ARE SIX POINTS THAT MUST BE CONSIDERED BEFORE ASSEMBLING THE MT-3000AEL.**

1. The MT-3000AEL can accommodate main boom diameters of 3" to 5". If your crossboom is smaller or larger, the mounting plates may need hole pattern modification. If you plan to use a tower section as a crossboom, M2 has tower adapter plates available. Call us at 559 432 8873 to discuss your special needs.

2. Multi conductor cable is needed to supply motor voltage / current and provide position feedback information. M2 can supply the required cable or you can purchase the ideal cable from The Wireman. The ideal cable contains two #12 AWG wires to power the 28 volt DC motor and two #22 AWG shielded wires to return the square wave position information to the controller.

LENGTH OF CABLE	TERMINAL 1 & 2 MINIMUM AWG	TERMINAL 5 & 6 MINIMUM AWG
125 FEET	#18 AWG	#22-24 AWG
125-200 FEET	#16 AWG	#22-24 AWG
200-300 FEET	#14 AWG	#22-24 AWG
300-450 FEET	#12 AWG	#22-24 AWG

3. Tower and mast requirements vary with the size of the array and the environment. Generally, towers like Rohn 25 or larger are adequate using mast sizes of 2 inch minimum.

4. Mast quality is crucial for large arrays. Do not use 1-1/2" water pipe (1-7/8" O.D.) as it is too soft. For small 4 Yagi arrays 2" x .180 wall steel tubing is recommended. Tube steel should meet ASTM 512, 513, or 519 specifications or equivalent. Simply stated steel with a psi rating over 50,000 PSI ( Pounds per square inch) is required. M2 can supply your mast if no local steel supply exists in your area.

5. Unless you need a tall mast for other antenna in your system, we recommend that the MT3000AEL is mounted with no more than 1/2" of mast protruding above the mounting plate. This will allow the system to rotate the full 180 degrees which aids during assembly and maintenance. We recommend that no more than 2 feet of mast extend beyond the top of the tower. 3 to 5 feet of mast inside the tower is adequate. We also recommend a top bearing and a secondary bearing inside the tower above the rotator.

6. The azimuth rotator is also very important in a good installation. Our OR2800PXEL azimuth rotator is totally compatible with the MT-3000AEL elevation rotator control box and the two control units link together so only one RS232 cable is required if you use computer control for tracking. Prop Pitch motors are also good for azimuth rotation and can be controlled using an M2 controller that is similar to the OR2800 controller but with higher current transformer and motor control circuitry. Again this PP controller is compatible with the MT-3000AEL controller.

Other possible rotators that could be adequate for your array are:

HDR-300

Tailtwister (T2X)

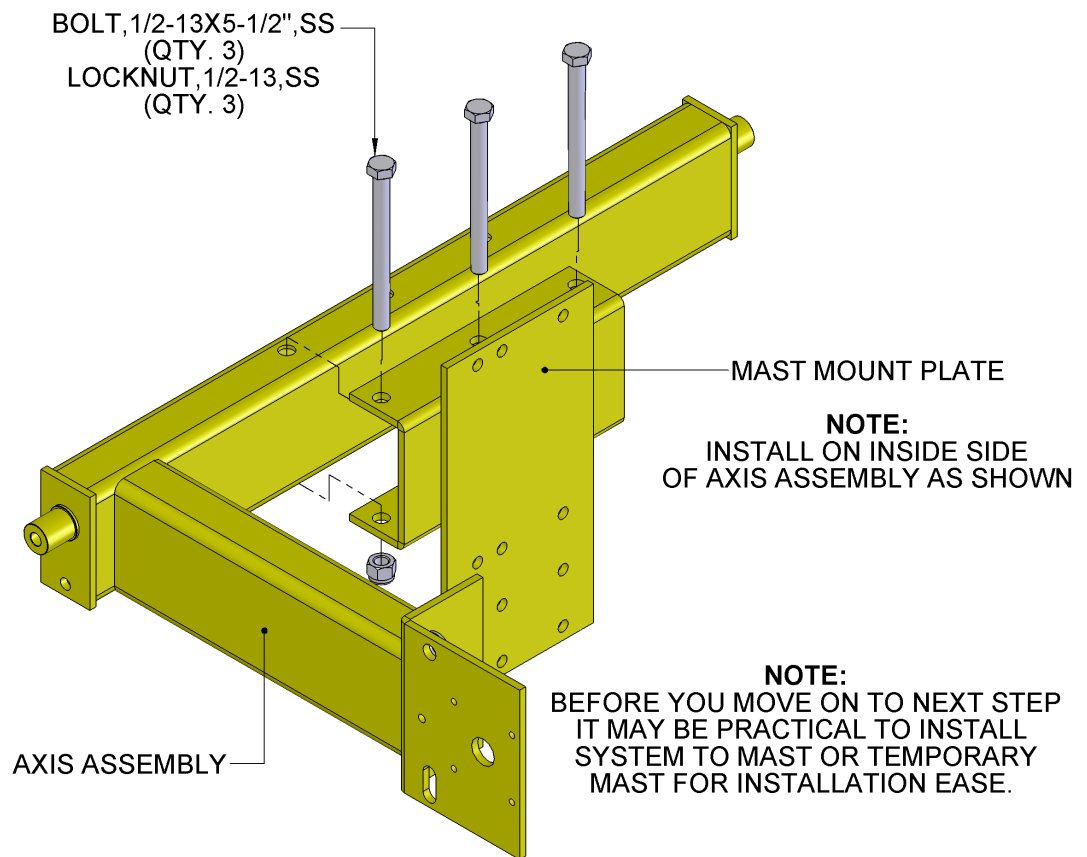
Ham IV

# MT-3000A PRE-INSTALLATION ASSEMBLY

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.

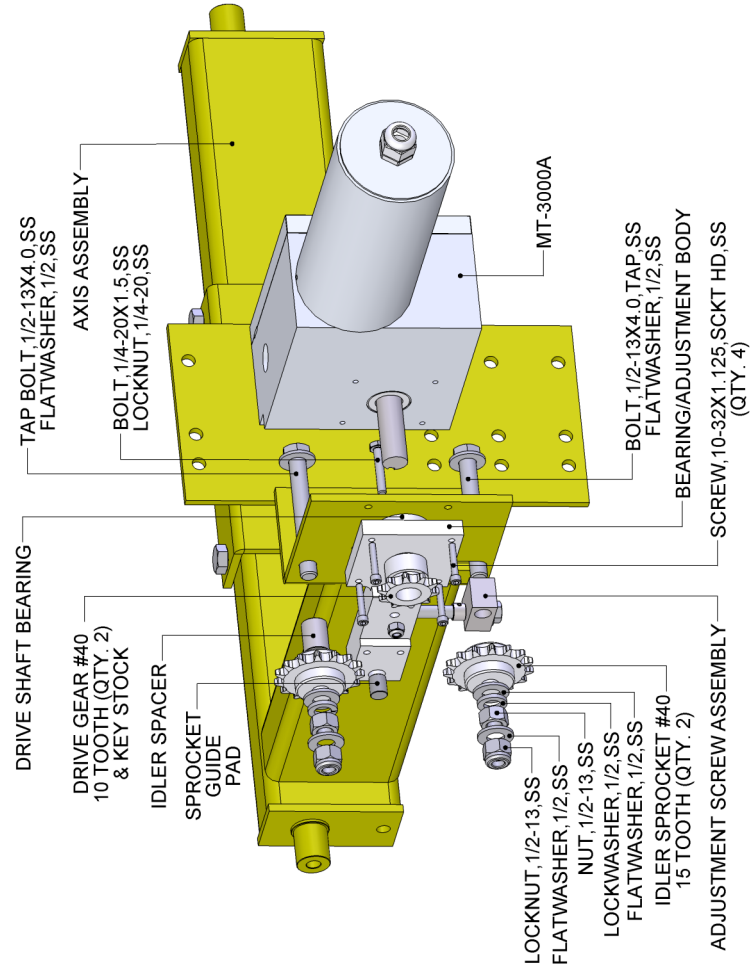
## PRE-INSTALLATION TIPS AND CONSIDERATIONS:

The MT-3000AEL gear box is shipped dry without oil, see the gear box motor detail for filling instructions. For best results, test and calibrate the **MT-3000AEL** (positioner, cable, and control unit) on a work bench or temporary foundation. This will familiarize you with the components and controls, their proper function, and allow testing of the terminal wiring and connection. Upon completion, the positioner can be run to a known compass or landmark

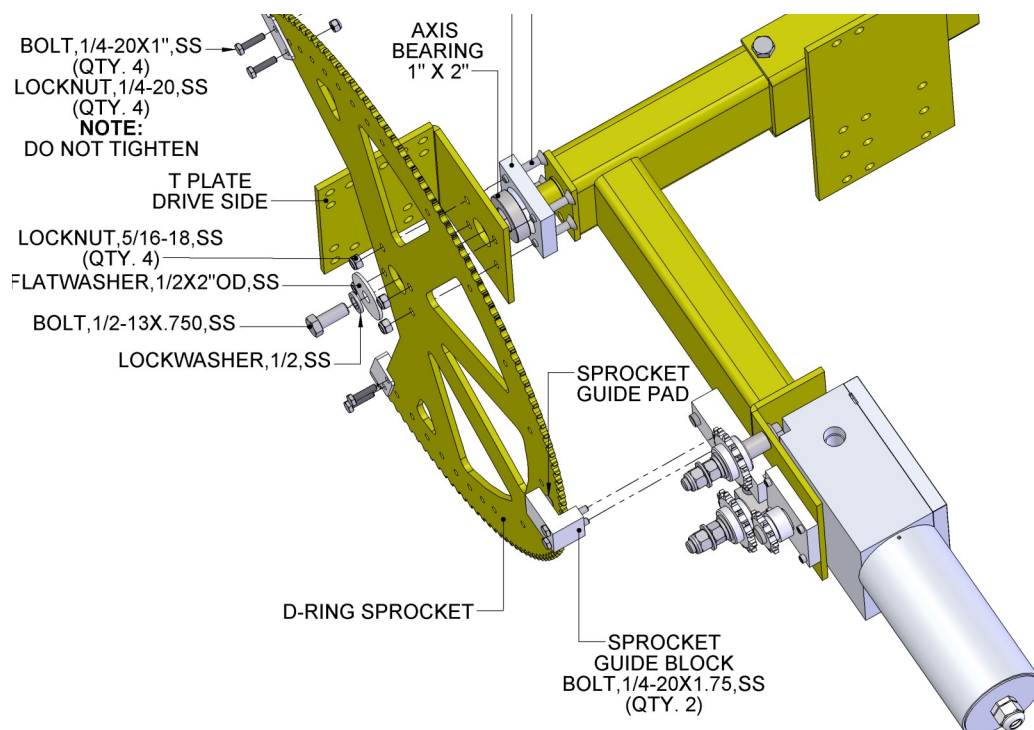
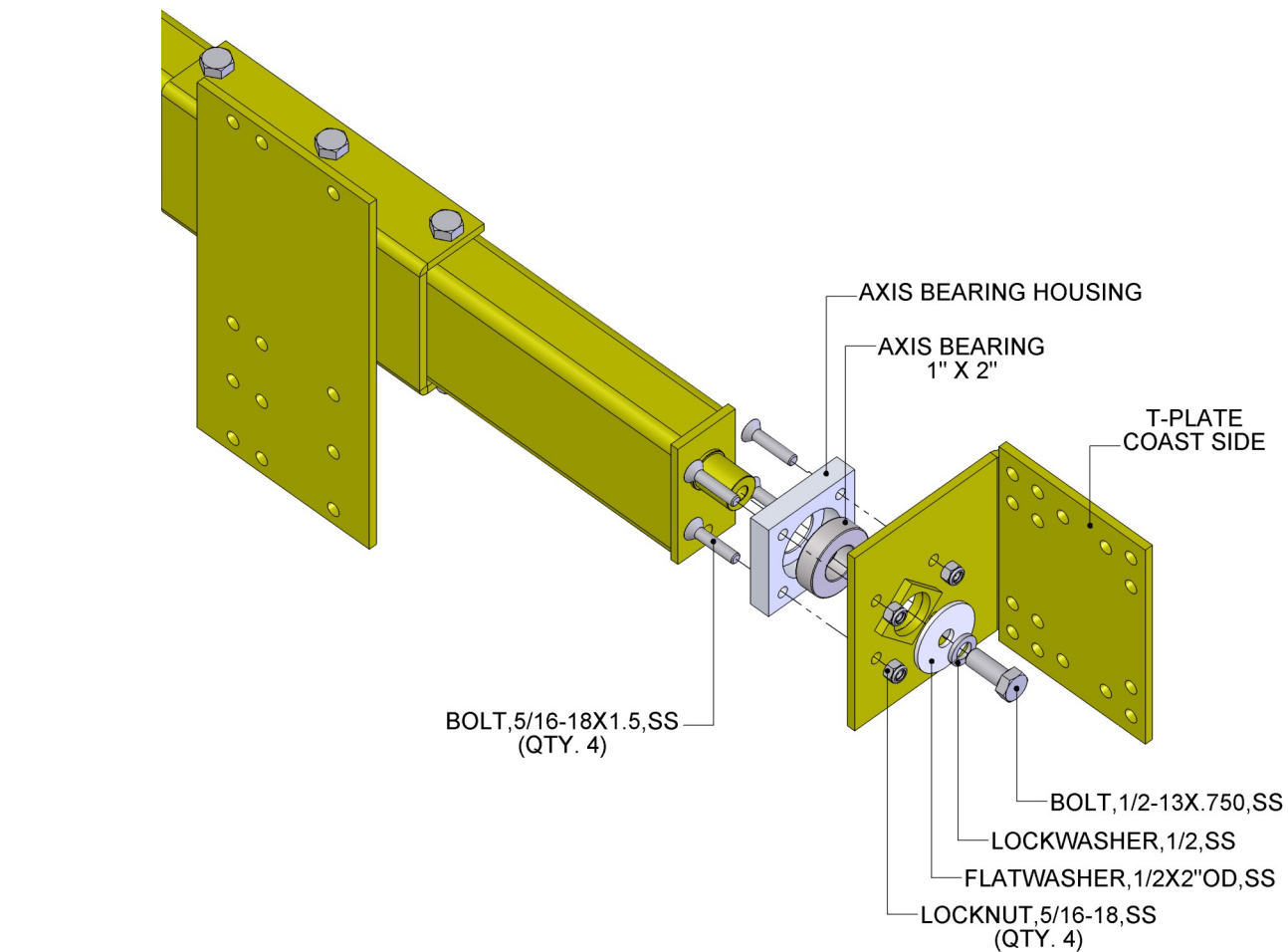


# MT-3000A & AXIS ASSEMBLY DETAIL

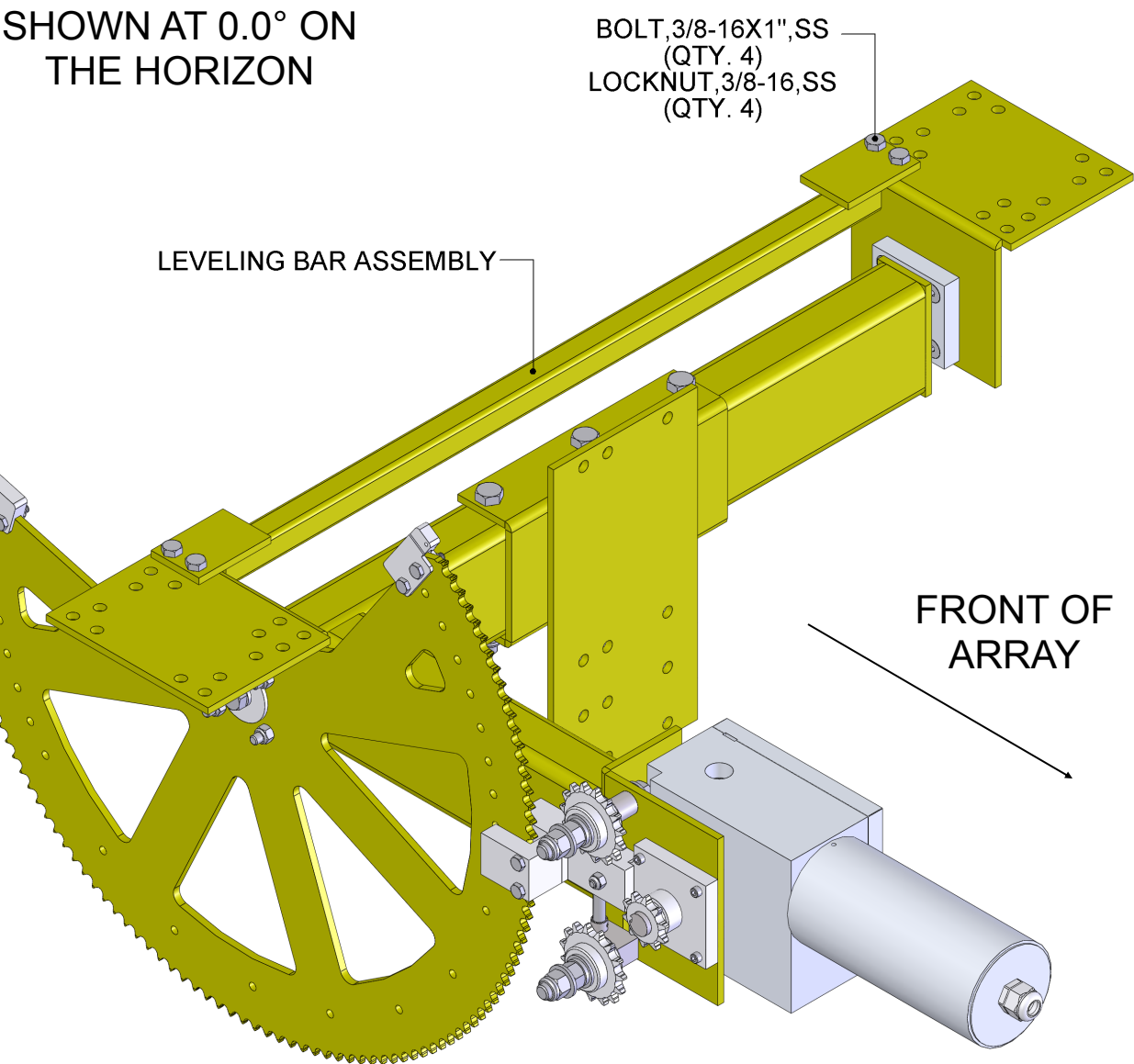
**NOTE:**  
IF YOU PURCHASED & ARE INSTALLING THE OPTIONAL LIMIT SWITCH KIT.  
LIMIT SWITCH PARTS MUST BE INSTALLED DURING THIS PROCEDURE.  
REFER TO LIMIT SWITCH KIT PAGES BEFORE ASSEMBLING PARTS & HARDWARES  
SHOWN BELOW.



# DRIVE SPROCKET & AXIS BEARING DETAIL



## LEVELING BAR ASSEMBLY



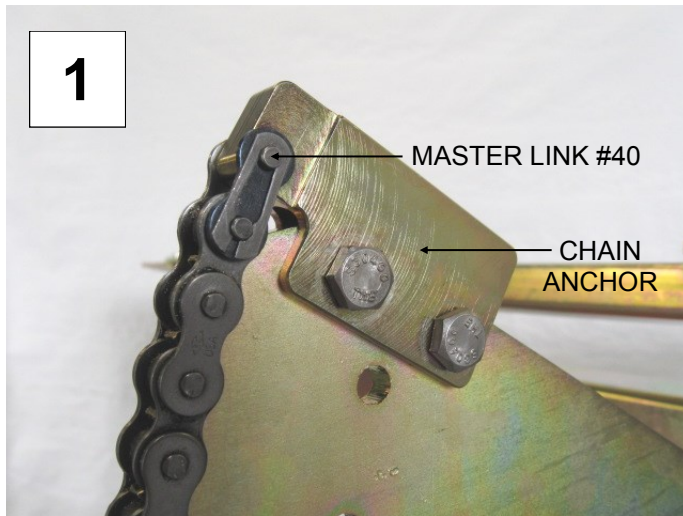
The leveling bar is mainly an installation tool to help keep mounting pads parallel during main cross boom installation.

Depending on your installation, topography & H-Frame type, your leveling bar can be installed in many configurations. The leveling bar can be removed after installation or left in place as long as it does not limit your system travel.



# MT-3000A CHAIN INSTALLATION

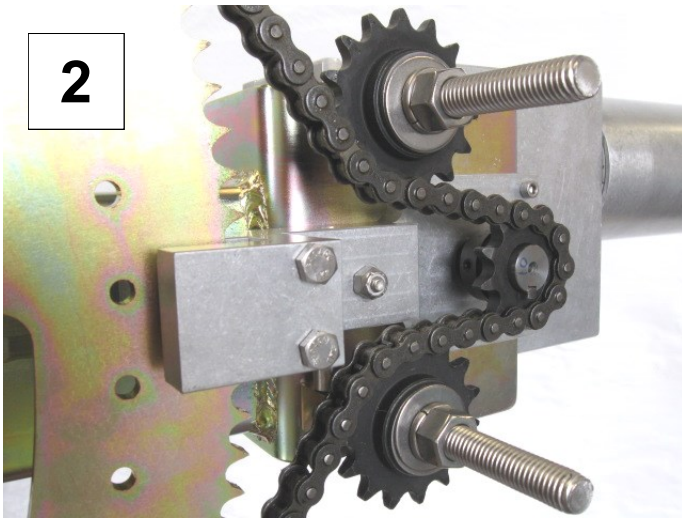
1



1. Install Master Link to chain and Chain Anchor.

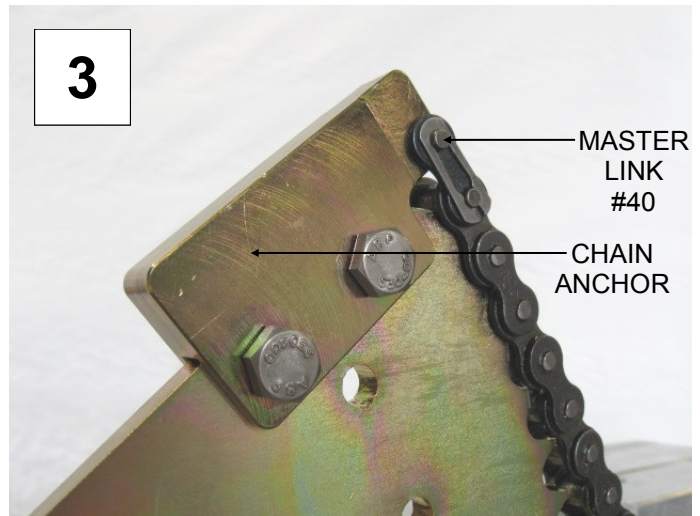
**Note: For installation ease keep bolts on chain anchors loose. Until chain has been routed thru sprockets and secured on other end of D-Ring.**

2



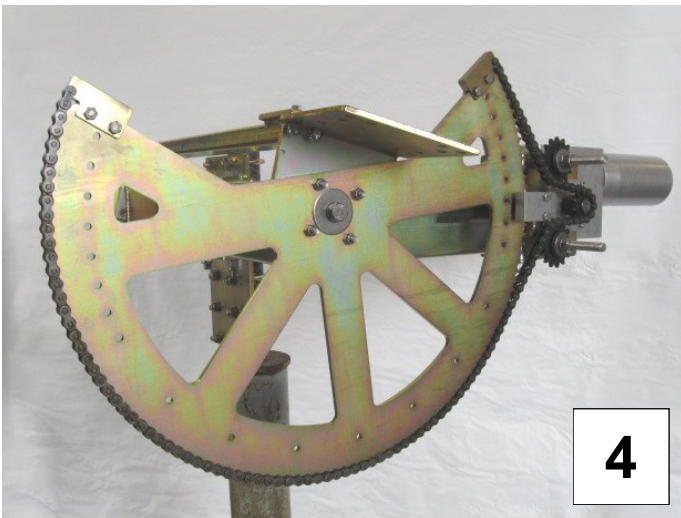
2. Route chain thru sprockets as shown on picture #2.

3



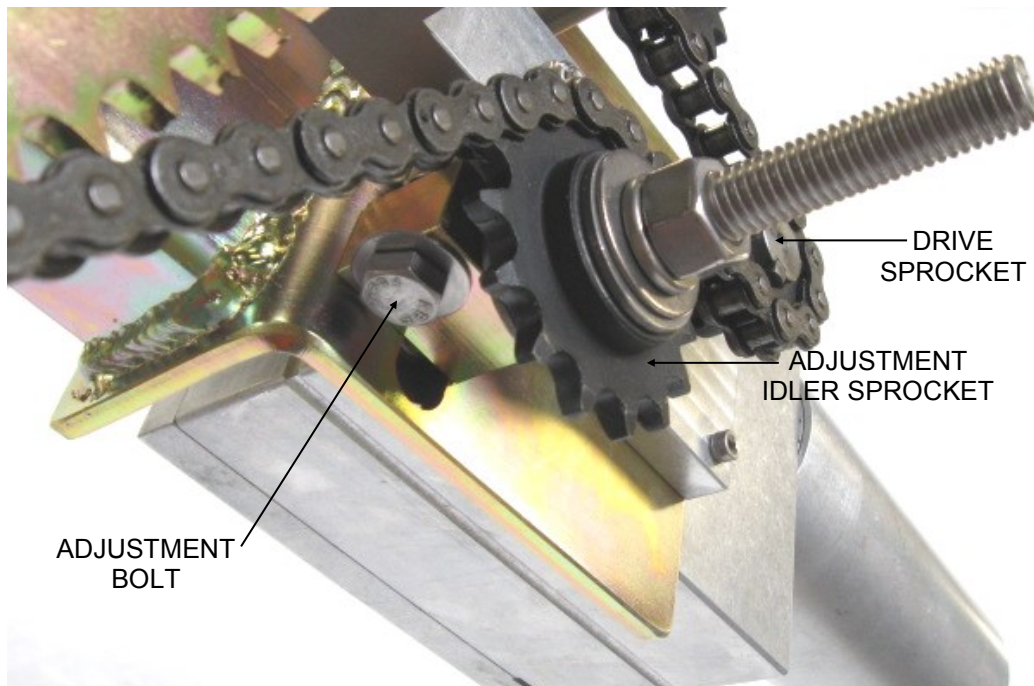
3. Use Master Link to secure chain to Chain Anchor on other end of D-Ring.

4



4. Make sure and tighten bolts on Chain Anchors. See next page for chain & idler adjustment details.

# CHAIN & IDLER SPROCKET ADJUSTMENT



Excessive chain slop or play may develop after using system for some time. We have incorporated in a chain adjustment to keep chain slop or play at a minimum.

Please review drawings shown for more detailed information.

To adjust system:

1. Position your array where it might be slightly out of balance so to allow the chain slop to gather between the adjustment idler sprocket and the large drive sprocket. Loosen the 1/2-13 x Locking nut on the adjustment sprocket **slightly**.
2. Use a 9/16" socket wrench to turn adjustment bolt.
3. Clockwise rotation of the adjustment bolt will tighten the chain. Adjust the chain to 1/8" of slop or play. **Over tightening the chain can put excessive tension on the idlers and gear box drive shaft.**
4. Counter clockwise rotation of the adjustment bolt will loosen the chain.

**Note: Over tightening the chain can put excessive tension on the idlers and gear box drive shaft. A loose chain can allow elevation axis system movement**

5. Tighten locking bolts and nuts test system. Look for consistent chain tension throughout your system movement.

6. After test tighten all hardware and replace cover.

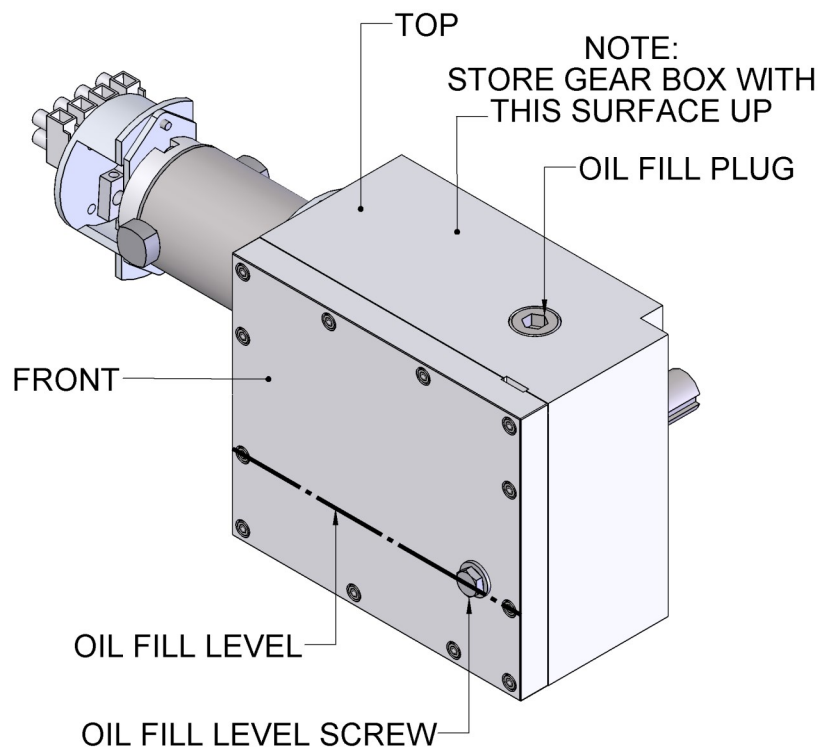


# GEAR BOX MOTOR DETAIL

The New MT-3000AEL has been outfitted with a high performance high efficiency gear box using all roller bearings and gear oil. The gear box has been assembled with a light coat of lubricating oil. No load testing can be performed during ground set up and test before gear box is filled with oil. Gear oil should be installed before final installation. SAE 80/90 WT oil has been provided. In normal operation the motor shaft is only subject to oil splash, a splash seal has been installed for normal operation. **Some oil seepage can occur if the motor is stored incorrectly.** See drawing below for storage position. Be sure to drain oil before storage or shipping.

## Filling instructions

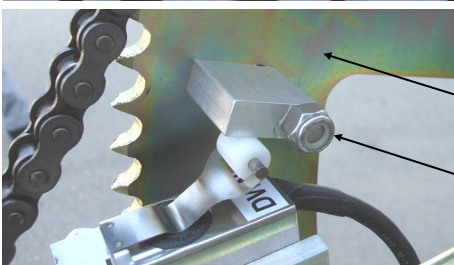
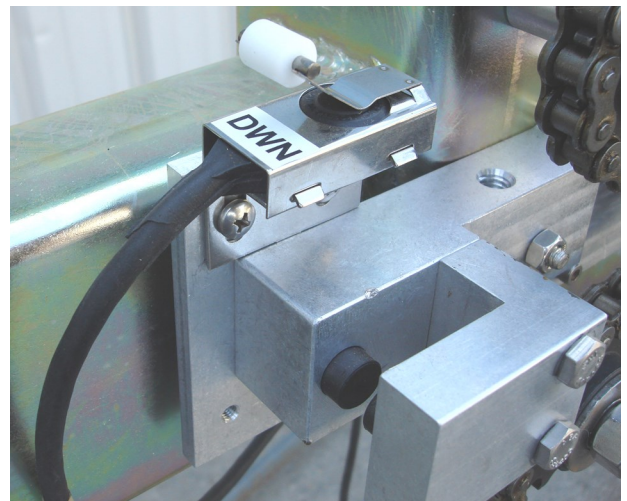
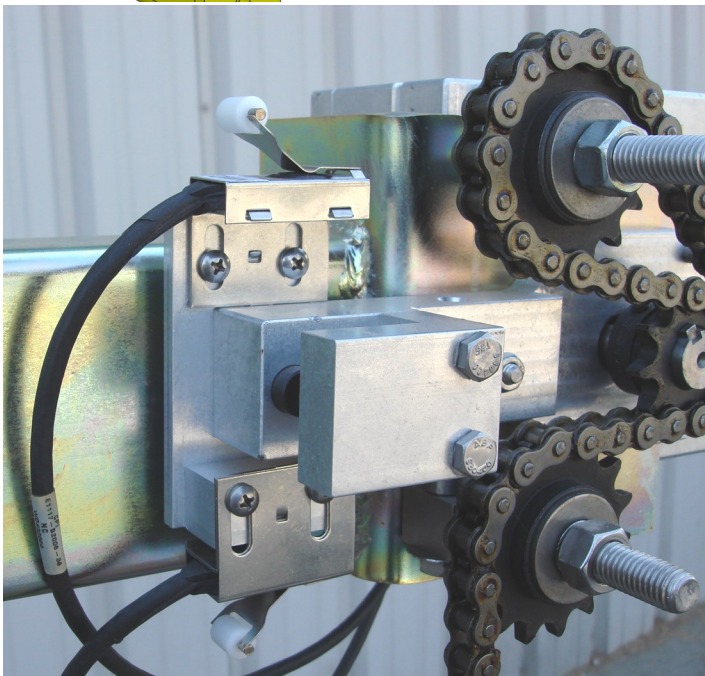
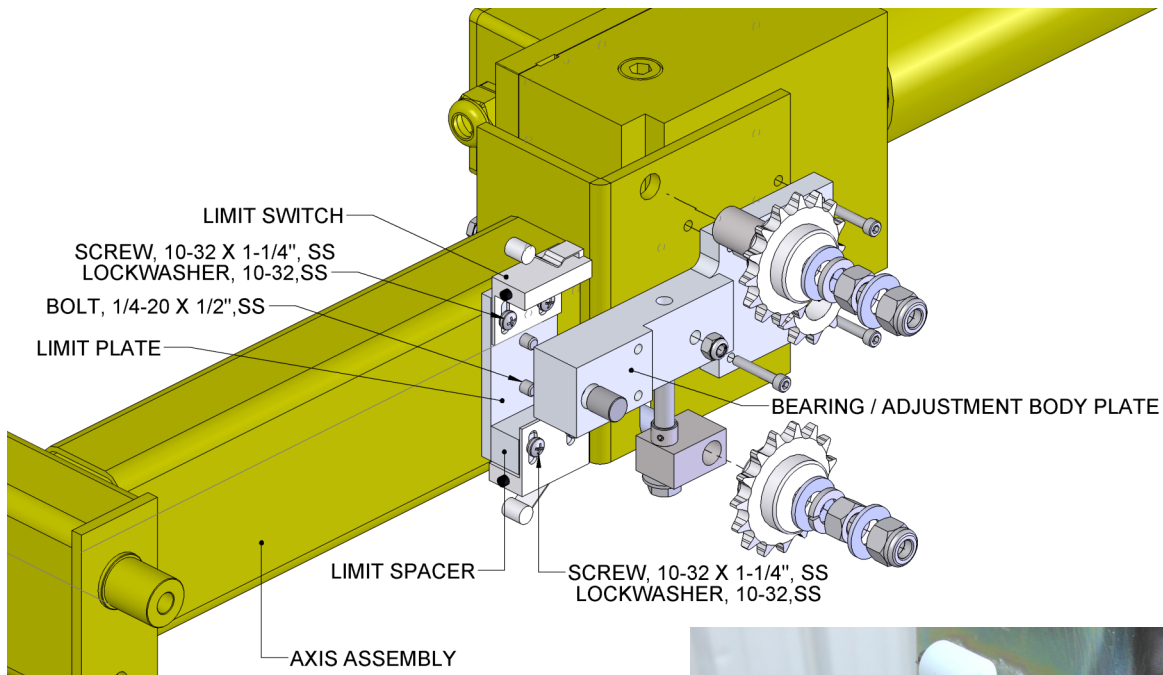
Remove oil fill level screw with washer and oil fill plug. Use SAE 80/90 WT oil & fill gear box to oil level line using the open oil fill level screw hole as a visual guide. Immediately re-insert oil fill level washer & screw & oil fill plug. Wipe any excess oil.



# LSK-3000 LIMIT SWITCH KIT

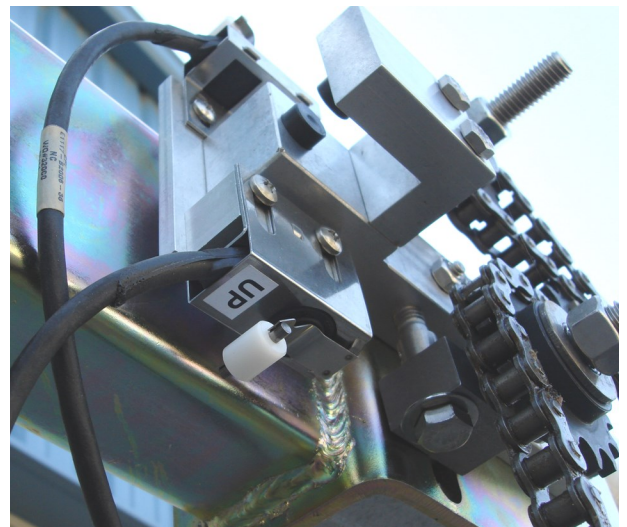
## NOTE:

LIMIT PLATE MUST BE INSTALLED TO BEARING ADJUSTMENT BODY PLATE WITH; BOLT, 1/4-20 X 1/2" (QTY. 2) BEFORE IT BECOMES UN-ACCSESIBLE. WHEN INSTALLING BEARING / ADJUSTMENT BODY PLATE TO AXIS ASSEMBLY.  
(SEE PHOTOS FOR MORE INFORMATION)



D-RING SPROCKET

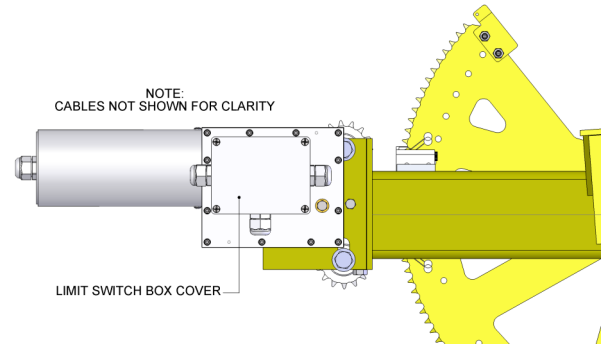
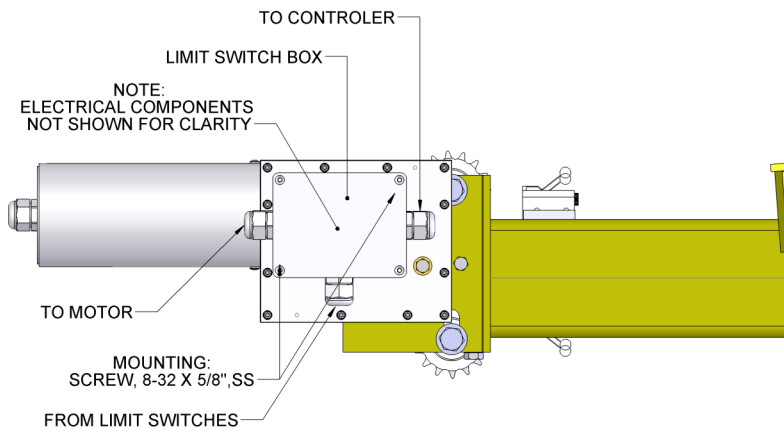
LIMIT STOP BLOCK  
BOLT, 1/4-20 X 1-3/4", SS  
LOCKNUT, 1/4-20, SS



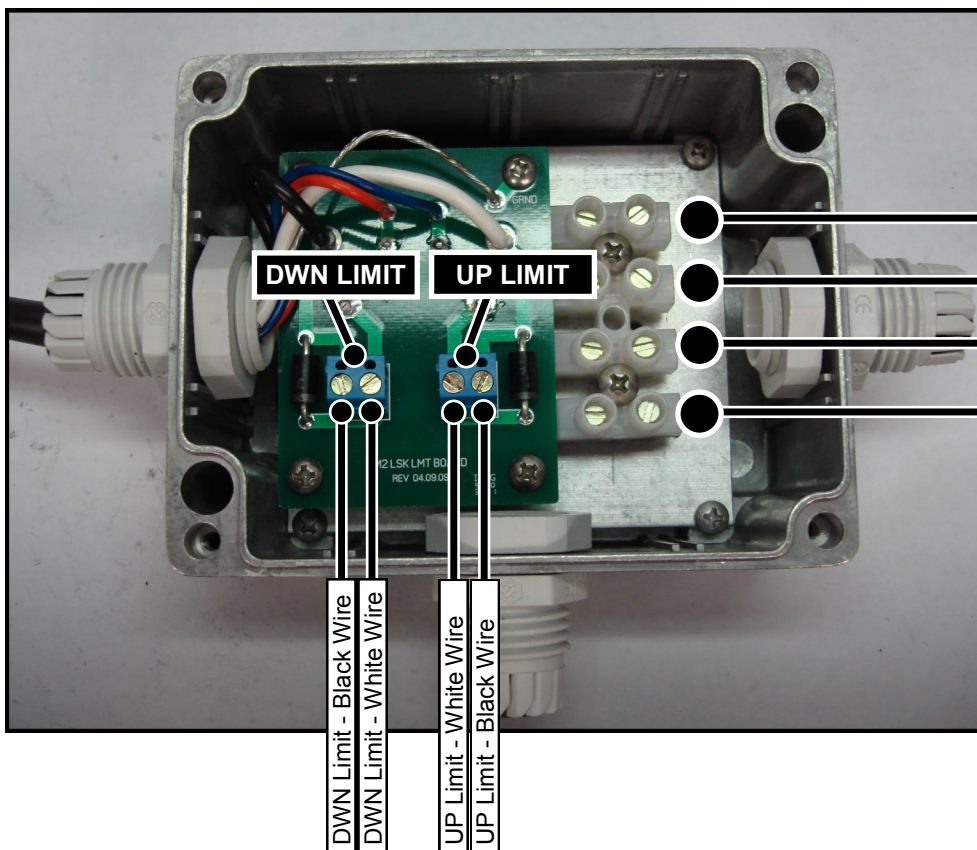
# LSK-3000 LIMIT SWITCH KIT

## NOTE:

INSTALL LIMIT SWITCH BOX TO MOTOR. ROUTE CABLES AS SHOWN BELOW & REFER TO LIMIT SWITCH BOX PICTURE FOR WIRING DETAILS. INSTALL LIMIT SWITCH BOX COVER WITH SCREWS SUPPLIED WITH COVER.



## LIMIT SWITCH BOX WIRING DETAIL



# MT-3000A PARTS & HARDWARE

DESCRIPTION	QTY
Axis Assembly (welded).....	1
Mast Mount Plate.....	1
"T" Plate, Coast Side (welded).....	1
"T" Plate, Drive Side .....	1
D-Ring Sprocket .....	1
Leveling Bar Assembly .....	1
MT-3000AEL, Elevation 1200:1 Gear Box & Motor .....	1
Axis Bearing Housing .....	2
Axis Bearing, 1.0 x 2.0 (bcg1641dctntg18) .....	2
Bearing / Adjustment Body .....	1
Drive Shaft Bearing (bcgr122rs) .....	1
Adjustment Screw assembly.....	1
Sprocket Guide Block .....	1
Sprocket Guide Pad (delrin) .....	2
Idler Sprocket, #40 15 tooth (bcgm41e15).....	2
Idler Spacer .....	1
Drive Gear #40 10 tooth (bcgm40b1034) .....	1
Key Stock 3/16 x 1.0 ss .....	1
Roller Chain, #40 x 56.750 END TO END .....	1
Chain Anchor.....	2
Master Link #40 .....	2
<b>HARDWARE</b>	
Bolt, 1/2-13 x 5 1/2", Hex Hd, ss .....	3
Bolt, 1/2-13 x 4" (Tap Bolt) ss .....	2
Bolt, 1/2-13 x 3/4", Hex Hd, ss .....	2
Washer, Flat 1/2 x 2" OD ss (HWS05000305) .....	2
Washer, Flat 1/2", ss.....	6
Washer, Locking 1/2", ss .....	4
Nut, 1/2-13 ss .....	2
Nut, Locking 1/2-13.....	5
Bolt, 3/8-16 x 1", Hex Hd, ss .....	4
Nut, Locking 3/8-16 ss .....	4
Bolt, Flat Head 5/16-18 x 1-3/4" ss .....	4
Bolt, Flat Head 5/16-18 x 1-1/2" ss .....	4
Nut, Locking 5/16-18, ss .....	8
Bolt, 1/4-20 x 1-3/4", ss.....	2
Bolt, 1/4-20 x 1-1/2", ss.....	1



# MT-3000A PARTS & HARDWARE

DESCRIPTION	QTY
Bolt, 1/4-20 x 1", Hex Hd, ss .....	4
Nut, Locking 1/4-20, ss .....	5
Screw, Allen Head cap 10-32 x 1-1/8", ss.....	4
U-Bolt and Cradle 4" .....	4
U-Bolt and Cradle 3" .....	4
U-Bolt and Cradle 2" HD .....	4
Nut, 3/8-16,ss .....	16
Washer, locking 3/8", ss .....	16
Allen Wrench, 3/16 .....	1
Allen Wrench, 5/32 .....	1
Allen Wrench, 1/8 .....	1

## OPTIONAL LIMIT SWITCH KIT (LSK-3000)

Limit Switch Junction Box / Mounting Hardware .....	1
Limit Switch Plate .....	1
Limit Switch Spacer .....	1
Limit Switch w/ 36" wire (eswe1117x2).....	2
Limit Stop.....	2
Bolt, 1/4-20 x 1 3/4", Hex Hd, ss .....	2
Bolt, 1/4-20 x 1/2", Hex Hd, ss .....	2
Screw, 8-32 x 5/8", Hex Hd, ss .....	2
Screw, 10-32 x 1-1/4", Ph Phl, ss .....	2
Screw, 10-32 x 3/8", Ph Phl, ss.....	2
Flat Washer, #10 ss.....	4
Locking Washer, #10 ss .....	4

Carefully manufactured by:

## M<sup>2</sup> ANTENNA SYSTEMS, INC.

4402 N. Selland Ave.

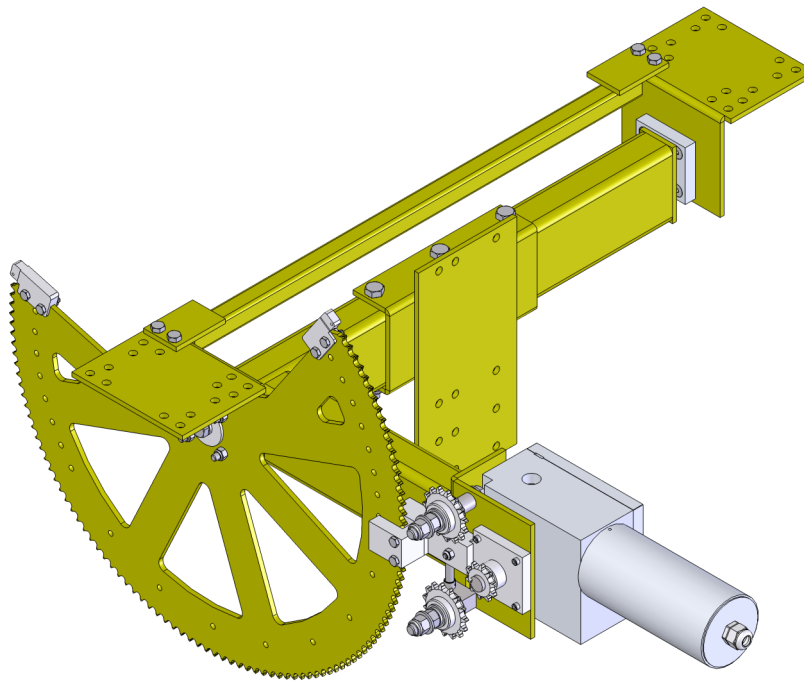
Fresno, CA 93722

(559) 432-8873 Fax: 432-3059

[www.m2inc.com](http://www.m2inc.com) Email: [sales@m2inc.com](mailto:sales@m2inc.com)



# 12 MONTH LIMITED WARRANTY



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 **MT-3000AEL** 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.

**M2 Antenna Systems, Inc. 4402 N. Selland Ave. Fresno, CA 93722**  
**(559) 432-8873 Fax (559) 432-3059 Web: [www.m2inc.com](http://www.m2inc.com)**