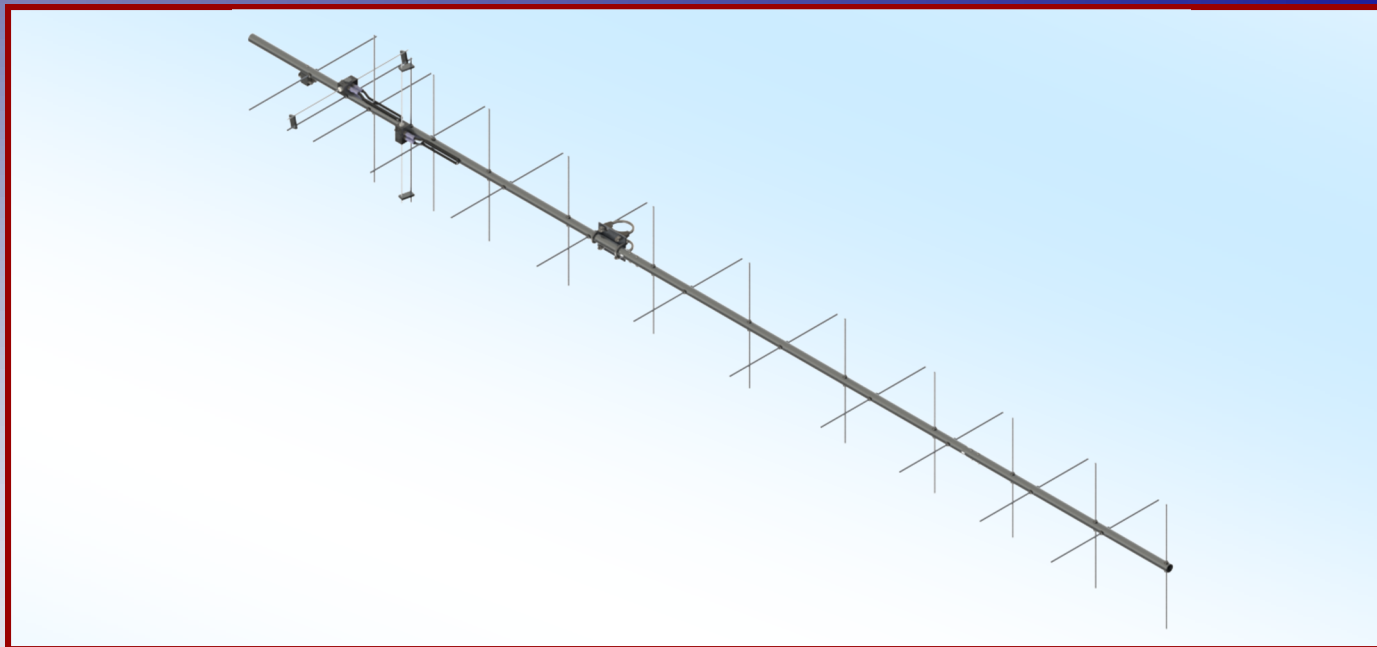




# M2 Antenna Systems, Inc.

## Model No: FG317CP24



### SPECIFICATIONS:

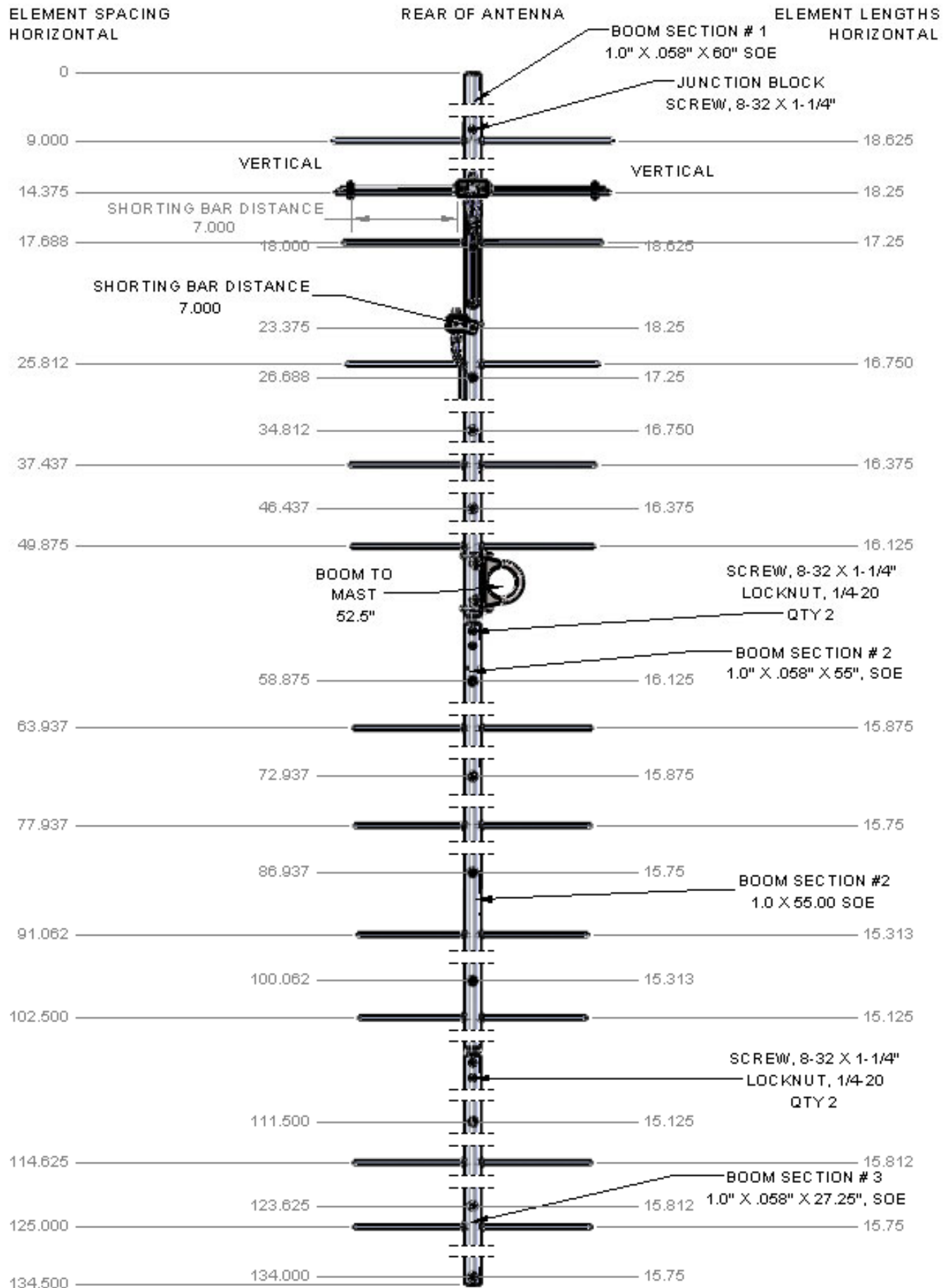
Model .....	FG317CP24	Input Connector .....	"N" Female
Frequency Range.....	312 to 322 MHz	Power Handling .....	1.5 kW
*Gain .....	15.17 dBi	Boom Length / Día .....	134.5" / 1"
Front to back .....	23.21 dB Typical	Maximum Element Length.....	18.5"
Beam width .....	36° Circular	Turning Radius: .....	82.25"
Ellipticity .....	>3dB	Stacking Distance.....	60" High & 60" Wide
Feed type .....	"T" Match	Mast Size.....	1-1/2" to 2" Nom.
Feed Impedance. ....	50 Ohms Unbalanced	Wind area / Survival .....	1.0 Sq. Ft. / 100MPH
Maximum VSWR.....	1.5:1 Typical	Weight / Ship Wt.....	5 Lbs. / 8 Lbs.

**\*Subtract 2.14 from dBi for dBd**

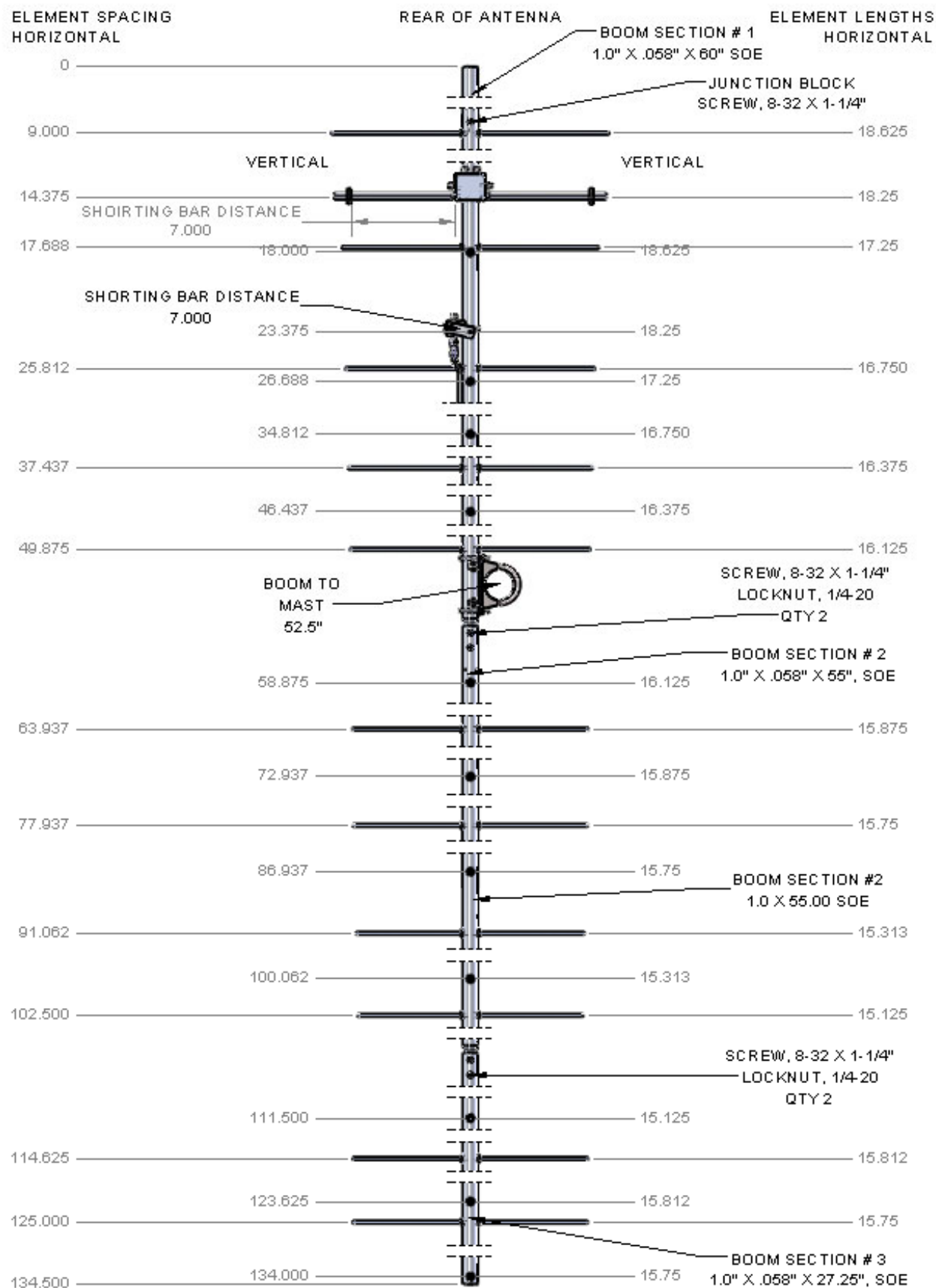
### FEATURES:

The 317CP24 is a broad band, circularly polarized antenna optimized for Low Earth Orbit (LEO) satellite communications or other applications where a broad band circular polarized antenna is required. Optimum match is between 312 & 322 MHz. A preamp can be mounted close to the antenna for almost no coax loss before the preamp, maximizing your receive performance. Computer design techniques help keep spurious side lobes low down for optimum signal to noise ratios. This antenna features the same CNC machined, O-ring and silicone-gel sealed, driven element assemblies common to all M<sup>2</sup> Yagi antennas. This insures years of trouble free performance regardless of weather.

# 317CP24 DIMENSION SHEET



# 317CP24 WITH POLARITY SWITCH DIMENSION SHEET



# 317CP24 ASSEMBLY MANUAL

TOOL REQUIRED FOR ASSEMBLY: screwdriver, 11/32" nut driver or wrench, 7/16" and 1/2" end wrenches and sockets, measuring tape. Start by laying out the boom sections using the DIMENSION SHEET as a guide. Use 8-32 X 1-1/4" screws and locknuts to join sections.

**Note: If mounting antenna to a standard H-frame with a T-brace kit, it is important to install the T-brace coupling bars to antenna before elements. Refer to H-Frame and T-brace drawings for placement and more information.**

## ASSEMBLING THE HORIZONTAL ELEMENTS

2. Separate elements by length into two identical sets, "H" and "V". Lay out the "H" elements by length and position as shown the DIMENSION sheet. Start with the reflector (longest) element. Balance it on your finger to find rough center and push on a black button insulator to about 1/2" off center. Push the element through the hole on the boom and install the second button, snugging it up into boom. DO NOT BOTHER ACCURATELY CENTERING the element at this time and DO NOT INSTALL the stainless steel shaft retainers yet. It is easier to do it after all the horizontal elements are installed in the boom.
3. Install the 3/16" rod DRIVEN ELEMENT as you did the reflector. Then continue with the installation of the DIRECTORS. ***Note that the Director Elements do not consistently diminish in length from rear to front, so pay close attention to length and position.***
4. Now begin centering the elements. Use a tape measure to EQUALIZE the amount the element sticking out on each side of the boom. Once you have all the elements centered, sight down the element tips from the rear comparing each side. Look for any obvious discrepancies and correct if found.
5. NOTE: The SHAFT RETAINERS, for securing the elements, should always be used for permanent and long term antenna installations. For portable or temporary use the retainers may be left off. The button insulators, normally a tight fit, hold the elements quite securely. To install the stainless steel SHAFT RETAINERS, use thumb and forefinger to hold the retainer over the end of the PUSH TUBE ( 3/8" x 3" tube, supplied in the kit), internal fingers on retainer dished into tube. HOLD THE ELEMENT FIRMLY TO PREVENT IT FROM SLIDING OFF CENTER and press the retainer onto the element end and continue until retainer butts on insulator button. Locking pliers, ***lightly*** clamped up against opposite button insulator will help maintain center reference. If you push the first retainer too far, remove element from boom, push retainer completely off the element, and start over. Install another retainer to the opposite side of the element. Continue installing retainers until all elements are locked in place.
6. Mount the **HORIZONTAL** DRIVEN ELEMENT BLOCK / ROD ASSEMBLY to the **TOP** of the boom using a single 8-32 X 1-1/4" screw. Install the 8-32 x 1/4" set screws (internal Allen head - tool supplied) into the SHORTING BARS. Slide the bars onto the Driven Element Block Rods as shown on the Dimension Sheet and tighten the set screws.
7. Mount the JUNCTION BLOCK as shown on the Dimension Sheet. Secure with 8-32 x 1-1/4" screw. (SEE PHOTO FOR MORE INFORMATION).

## ASSEMBLING THE VERTICAL ELEMENTS

8. Repeat steps #2 through #5 for the Vertical elements, using the Dimension Sheet as your guide to

# 317CP24 ASSEMBLY MANUAL

lengths and spacing.

9. **NOTE: INSTALLATION OF THE VERTICAL DRIVEN ELEMENT BLOCK DETERMINES THE CIRCULARITY OF THIS ANTENNA. THE ORIENTATION OF THE BLOCK FOR RHC - RIGHT HAND CIRCULARITY - IS SHOWN ON THE DIMENSION SHEET.**  
Viewed from the rear of the boom (rearmost Reflector HORIZONTAL), the VERTICAL Driven Element Block mounts to the RIGHT hand side of the boom with the two Balun connectors oriented to the FRONT. Secure with 8-32 x 1-1/4" screw. Install the Shorting Bars as in step #6. For Left Hand Circularity, mount the Vertical driven element block to the opposite side of the boom, balun connectors to front.
10. Attach Baluns and Phasing lines to the Driven Element Blocks and Junction Block as shown on the Dim. Sheet. Depending on model and polarity, the Vertical balun may loop around another element. This is normal. Coil rear balun if single loop overhangs rear of boom. Form balun and phasing line coax close to the boom and secure with nylon cable ties. Ties should be snug but not crushing or kinking the coax. Tighten the connectors **gently** using a 7/16" end wrench. A lot of torque is unnecessary.
11. Use good quality coax and "N" connector for your feedline. Secure feed coax near connector on Junction Block, to provide stress relief, route to rear of boom, and secure again. Allow about 60" of coax to hang in a loop between the rear end of the boom and the reattachment point (at least 12" beyond element tips) on the mast or cross boom. ***Do not route feedline to boom to mast plate as exiting antenna here will adversely affect circular field.***
12. The boom to mast plate is normally mounted to the boom at the balance point (with feedline attached). Use two 1" U-bolts and the stainless nuts and lock washers provided. DO NOT OVER TIGHTEN. 2" U-bolts are provided for mounting the antenna to your NON-CONDUCTIVE 2" mast or cross boom.

## INSTALLATION TIPS

13. The 317CP24 is a circular polarized antenna and creates a field in all planes or polarities. Performance DETERIORATES SIGNIFICANTLY if it is mounted on a metal (conductive) mast or cross boom. A 2" mast or cross boom of any NON-CONDUCTIVE material can be used. Fiberglass is the prime choice for its strength and weather resistance. Mount the antenna so that element tips are at least 12" from any conductive material (mast, tower, feedline, etc.).

**THIS COMPLETES THE ANTENNA ASSEMBLY.**

Carefully manufactured by:

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

4402 N. Selland Ave.

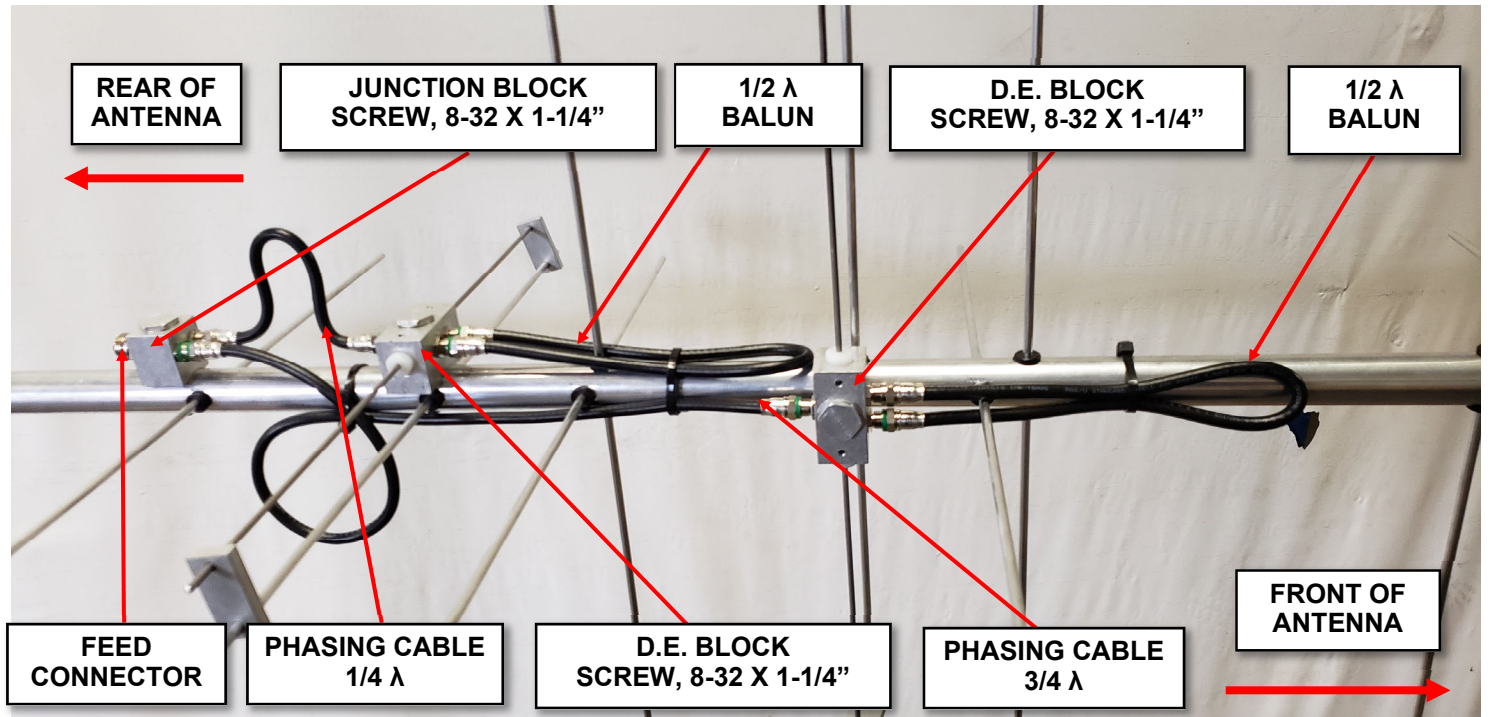
Fresno, CA 93722

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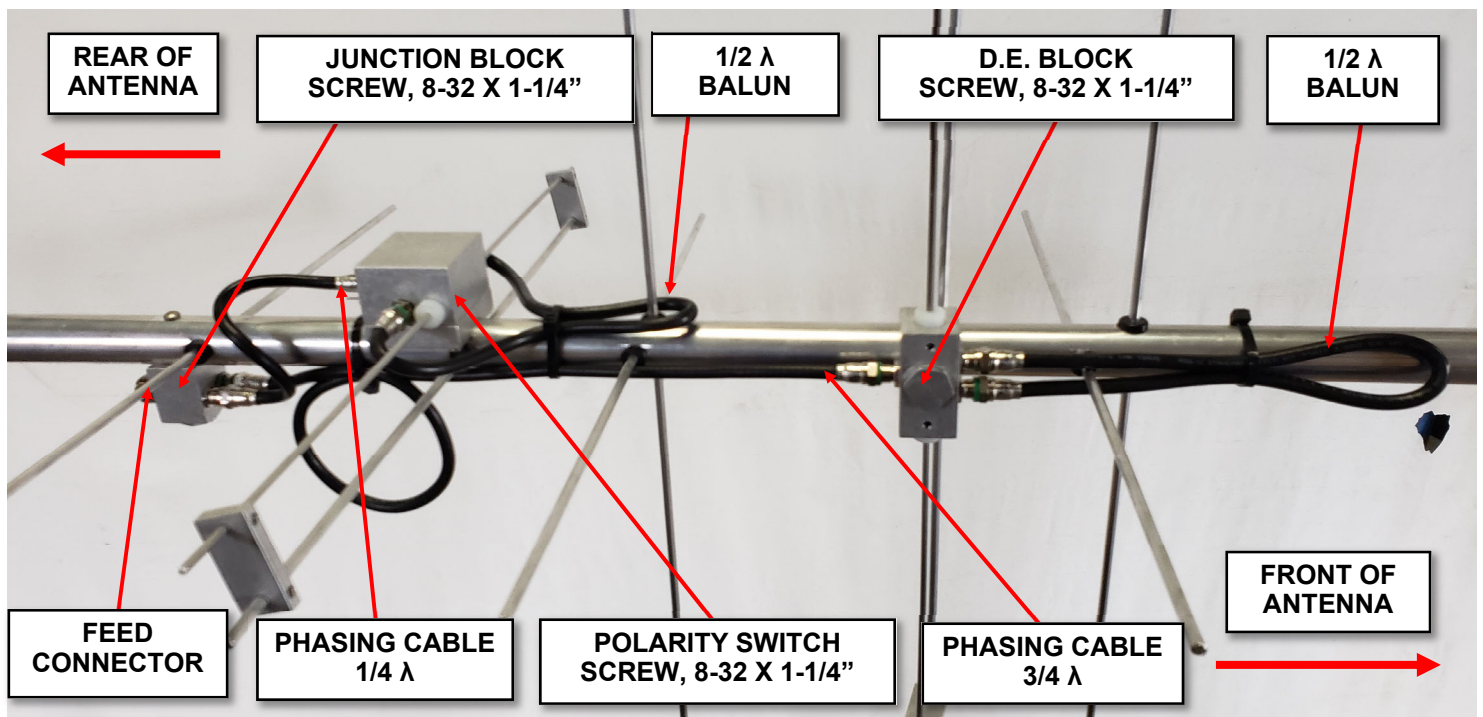
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# 317CP24 ASSEMBLY MANUAL



CABLE ROUTING DIAGRAM WITHOUT POLARITY SWITCH



CABLE ROUTING DIAGRAM WITH POLARITY SWITCH

# 317CP24 PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION #1, 1" X .058" X 58", SOE (M2ABS317CP24-1) .....	1
BOOM SECTION #2, 1" X .058" X 53", SOE (M2ABS317CP24-2) .....	1
BOOM SECTION #3, 1" X .058" X 29.5" (M2ABS317CP24-3) .....	1
ELEMENTS, 3/16" ROD X Dimension Sheet (SAEL317CP24) .....	22
DRIVEN ELEMENT BLOCK ASSEMBLY (SADEA317CP24) .....	2
JUNCTION BLOCK (SADE0065) .....	1
BALUN, RG-6 1/2λ.....	2
MATCHING / PHASING CABLE, 1/4λ .....	1
MATCHING / PHASING CABLE, 3/4λ .....	1
BOOM-TO-MAST PLATE, .125" X 3" X 4" (M2APT0019).....	1
U-BOLT AND CRADLE, 2" .....	2
U-BOLT, 1" .....	2
ASSEMBLY MANUAL .....	1

## IN HARDWARE BAG:

SHORTING BAR (M2ASB0080) .....	4
BUTTON INSULATORS .....	44
KEEPER, SS.....	44
NUT, 5/16-18, SS.....	4
LOCKWASHER, 5/16", SS.....	4
NUT, 1/4-20, SS.....	4
LOCKWASHER, 1/4", SS.....	4
SCREW, 8-32 X 1-1/4", PHILLIPS PAN HEAD, SS.....	7
LOCKNUT, 8-32, SS.....	4
SET SCREW, 8-32 X 1/4", SS .....	8
CABLE TIE, NYLON .....	6
ALLEN HEAD WRENCH, 5/64" .....	1
PUSH TUBE, 3/8 X 3" .....	1

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# 317CP24 WITH POLARITY SWITCH PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION #1, 1" X .058" X 58", SOE (M2ABS317CP24-1) .....	1
BOOM SECTION #2, 1" X .058" X 53", SOE (M2ABS317CP24-2) .....	1
BOOM SECTION #3, 1" X .058" X 29.5" (M2ABS317CP24-3) .....	1
ELEMENTS, 3/16" ROD X DIMENSION SHEET (SAEL317CP24) .....	22
POLARITY SWITCH (SAPS317CP24) .....	1
DRIVEN ELEMENT BLOCK ASSEMBLY (SADEA317CP24) .....	1
JUNCTION BLOCK (SADE0065) .....	1
BALUN, RG-6 1/2λ .....	2
MATCHING / PHASING CABLE, 1/4λ .....	1
MATCHING / PHASING CABLE, 3/4λ .....	1
BOOM-TO-MAST PLATE, .125" X 3" X 4" (M2APT0019) .....	1
U-BOLT AND CRADLE, 2" .....	2
U-BOLT, 1" .....	2
ASSEMBLY MANUAL .....	1

## IN HARDWARE BAG:

SHORTING BAR (M2ASB0080) .....	2
SHORTING BAR (M2ASB0090) .....	2
BUTTON INSULATORS .....	44
KEEPER, SS .....	44
NUT, 5/16-18, SS .....	4
LOCKWASHER, 5/16", SS .....	4
NUT, 1/4-20, SS .....	4
LOCKWASHER, 1/4", SS .....	4
SCREW, 8-32 X 1-1/4", PHILLIPS PAN HEAD, SS .....	7
LOCKNUT, 8-32, SS .....	4
SET SCREW, 8-32 X 1/4", SS .....	8
CABLE TIE, NYLON .....	6
ALLEN HEAD WRENCH, 5/64" .....	1
PUSH TUBE, 3/8 X 3" .....	1

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