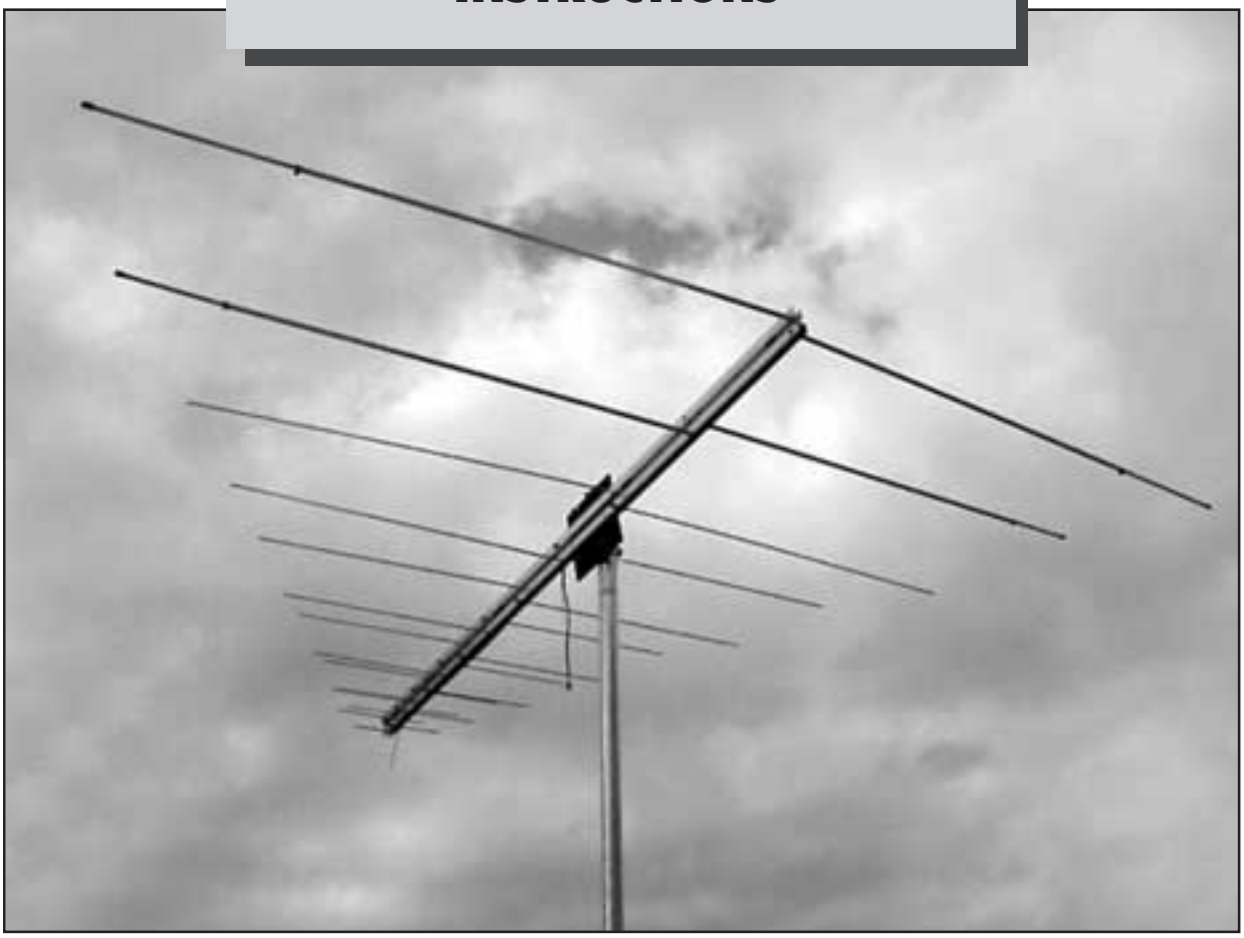
ASSEMBLY AND INSTALLATION INSTRUCTIONS



ASL670

50 - 500 MHz Log Periodic Antenna

CUSHCRAFT CORPORATION

951494 (3/01)

ASL670

WARNING

THIS ANTENNA IS AN ELECTRICAL CONDUCTOR. CONTACT WITH POWER LINES CAN RESULT IN DEATH, OR SERIOUS INJURY. DO NOT INSTALL THIS ANTENNA WHERE THERE IS ANY POSSIBILITY OF CONTACT WITH OR HIGH VOLTAGE ARC-OVER FROM POWER CABLES OR SERVICE DROPS TO BUILDINGS. THE ANTENNA, SUPPORTING MAST AND/OR TOWER MUST NOT BE CLOSE TO ANY POWER LINES DURING INSTALLATION, REMOVAL OR IN THE EVENT PART OF THE SYSTEM SHOULD ACCIDENTALLY FALL. FOLLOW THE GUIDELINES FOR ANTENNA INSTALLATIONS RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION AND LISTED IN THE ENCLOSED PAMPHLET.

Your Cushcraft VHF/UHF antenna is designed and manufactured to give top performance and trouble free service. The antenna will perform as specified if the instructions and suggestions are followed and care is used in assembly and installation. When checking the components received in your antenna package, use the parts lists in each section. It is easiest to identify the various dimensions of tubing by separating them into groups of the same diameter and length. If you are unable to locate any tube or component, check the inside of all tubing. *IMPORTANT: save the weight label from the outside of the carton. Each antenna is weighed at the factory to verify the parts count. If you claim a missing part, you will be asked for the weight verification label.* There is a master parts list on page 2.

LOCATION

For best "line-of-sight" performance, position your ASL670 as high as possible consistent with safe installation practices. Avoid surrounding obstructions such as trees, power lines, and other antennas--close proximity may reduce gain, alter directivity, or degrade VSWR. ***Important Warning: Never mount your antenna where humans and pets may contact it accidentally.*** Protruding elements and hardware are injury hazards, and contact with RF-energized conductors may cause injury, severe burns, or even death. Also, never mount transmitting antennas in locations that expose humans to intense RF fields. The effects may be harmful, and the FCC now has specific guidelines for determining safe RF exposure levels. For details, refer to FCC Part 97.13, to any current amateur radio handbook covering the topic of RF exposure, or contact the ARRL web site at *http://www.arrl.org/news/rfsafety/.* Finally, never install antennas without assistance. Plan work carefully and use only qualified persons to monitor your safely or help you. If you doubt your ability to complete the job safely, obtain the services of a professional installation company.

MOUNTING

The ASL670 mounting bracket accepts mast diameters to 2.5" (6.4 cm) O.D., but your antenna may be supported safely with 1.5" (3.8 cm) tubing. When installing multiple antennas on a single pipe, use a heavier mast with adequate strength to support the added load. Also, maximize spacing between antennas to reduce interaction. Your ASL670 package contains hardware for either horizontal or vertical mounting. For VHF operation, horizontal polarization is typically used for weak-signal CW, SSB, and AM, while vertical polarization is normal for FM and Data modes. In some regions, different conventions apply, so check local standards.

SYSTEM GROUNDING

Direct grounding of the antenna, mast and tower is very important. This serves as protection from lightning strikes, static buildup and high voltage which is present in the radio equipment connected to the antenna. A good electrical connection should be made to one or more ground rods (or other extensive ground system) directly at the base of the tower or mast, using at least #10AWG ground wire and non-corrosive hardware. For details and safety standards, consult the National Electrical Code. You should also use a coaxial lightning arrester. Cushcraft offers several different models, such as LAC-1, LAC-2 and the LAC-4 series.

ASSEMBLY

Assemble your antenna carefully, following the directions and illustrations provided in Steps 1-6. When finished, verify all elements are installed in the correct LPA alternating pattern, and confirm the tip-to-top length of each element matches those specified by the instructions. Finally, to avoid unwanted noise or detuning after installation, verify that all hardware is tight and worm clamps are secure.

TUNING PROCEDURE

When assembled according to instructions, no further tuning of the ASL670 is required. Element spacing and length were determined by computer model, and ham-band performance was further optimized using a HP-8753E network analyzer. Attempts to alter element lengths will likely degrade the overall balanced performance of the antenna. If VSWR exceeds 2:1 on any ham band, check for assembly errors, incorrect element sequencing, loose hardware, interfering obstructions within the near-field of the antenna, incorrect feedline routing, or a feedline fault. Feedline faults may include a short or open cable, sharp bends or kinks, and moisture or corrosion accumulation in connectors and lines.

Because the ASL670 spans the entire VHF spectrum (50-450 MHz), select only high-quality low-loss feedline and keep cable runs as short and direct as possible to minimize attenuation. The antenna's feedline is terminated in a low-loss female type-N connector. While N-to-UHF (SO239) adapters are readily available at most electronic supply sources, type-N connectors are recommended for operaton above 144 MHz.

MASTER PARTS LIST

KEY	PART #	DESCRIPTION	QUANTITY
4	010104	18-8 x1/4” stainless steel flat washer	4
7	010207	18-8 x.391” stainless steel flat washer	2
8	010208	18-8 x 3/8” stainless steel split lock washer	6
9	010209	18-8 x 3/8”-16 stainless steel hex nut	6
11	010011	18-8 x 8-32 stainless steel hex nut	6
20	010220	18-8 x 10-24 stainless steel hex nut	16
26	290326	Danger label	1
29	010229	18-8 x 8-32 RH slotted stainless steel machine screw	4
33	010233	18-8 #10 stainless steel split lock washer	16
35	170035	9/16”x3-1/2” large extruded aluminum V-Block	2
41	011941	18-8 #8 stainless steel split lock washer	6
45	321045	1/2”x5/16” Tumble aluminum spacer	4
52	014952	3/8” - 16 x 1” stainless steel hex head bolt	2
60	015060	18-8 #10 x1/4” stainless steel flat washer	16
77	050077	3/8”x7/8" (2.2 cm) black plastic cap	4
79	010079	RH slotted stainless steel machine screw	2
84	010084	18-8 stainless steel split lock washer	28
85	010085	18-8 1/4"-20 (.63 cm) stainless steel hex nut	52
88	205188	LPA mounting plate	1
89	195189	Truss bracket	2
91	015291	18-8 10-24 RH slotted stainless steel machine screw	16
92	205292	LPA spacer plate	4
94	015294	1/4"-20 x 1-3/4” (4.45 cm) hex screw	4
95	325295	3/8” x 3/4” Aluminum spacer	4
116	240116	Silicone Package	1
209	013209	18-8 3-8”-16 x 4” (.95 x 10.16 cm) stainless steel U-bolt	2
345	035345	CableTie	4
407	030407	7/32” (.56 cm) stainless steel worm gear clamp	4
BA	ASL670BA	ASL670 Boom Assembly	2
EL1	ASL670EL1	ASL670 ELEMENT 1	2
EL2	ASL670EL2	ASL670 ELEMENT 2	2
EL3	ASL670EL3	ASL670 ELEMENT 3	2
EL4	ASL670EL4	ASL670 ELEMENT 4	2
EL5	ASL670EL5	ASL670 ELEMENT 5	2
EL6	ASL670EL6	ASL670 ELEMENT 6	2
EL7	ASL670EL7	ASL670 ELEMENT 7	2
EL8	ASL670EL8	ASL670 ELEMENT 8	2
EL9	ASL670EL9	ASL670 ELEMENT 9	2
EL10	ASL670EL10	ASL670 ELEMENT 10	2
EL11	ASL670EL11	ASL670 ELEMENT 11	2
EL12	ASL670EL12	ASL670 ELEMENT 12	2
EL13	ASL670EL13	ASL670 ELEMENT 13	4
EL14	ASL670EL14	ASL670 ELEMENT 14	4
FL	ASL670FL	ASL670 FEEDLINE	1

1. Boom Assembly:

Find two 6'-8" aluminum channels (BA). These form the boom and phasing line assembly. Align these back-to-back, spaced approximately 3/4" apart as shown in **Figure-A Detail-1**. Assemble as follows:

Find two insulating spacer plates (92). Using 10-24 x 5/8" screws and #10 hardware, install one on each side of the boom at mounting holes provided between EL13 and EL14 toward the rear of the boom (see **Figure-A, Detail-2**).

Locate the feedline block (FL). Carefully spread the boom channels apart at the front for the antenna and slip the block into its mounting holes (see **Figure-A, Detail-3**). Please note that a green dot will be painted on the mounting block threaded stud (FL) that is connected to the shielded side of the coax.

Find the remaining two plastic insulating spacer plates (92). Install both at the mounting holes located between EL7 and EL8 (**Figure-A**).

Find the LPA mounting plate (88) and mount as shown in **Figure-A, Detail-4** using 1/4"-20 x 1-3/4" mounting bolts. Before inserting each bolt, install a 3/8" x 3/4" O.D. crush spacer (95) inside the channel.

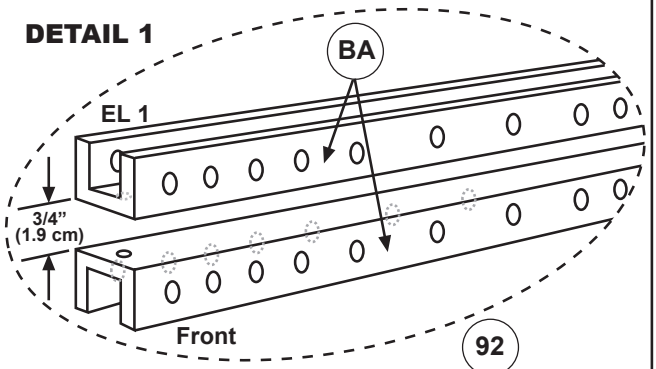
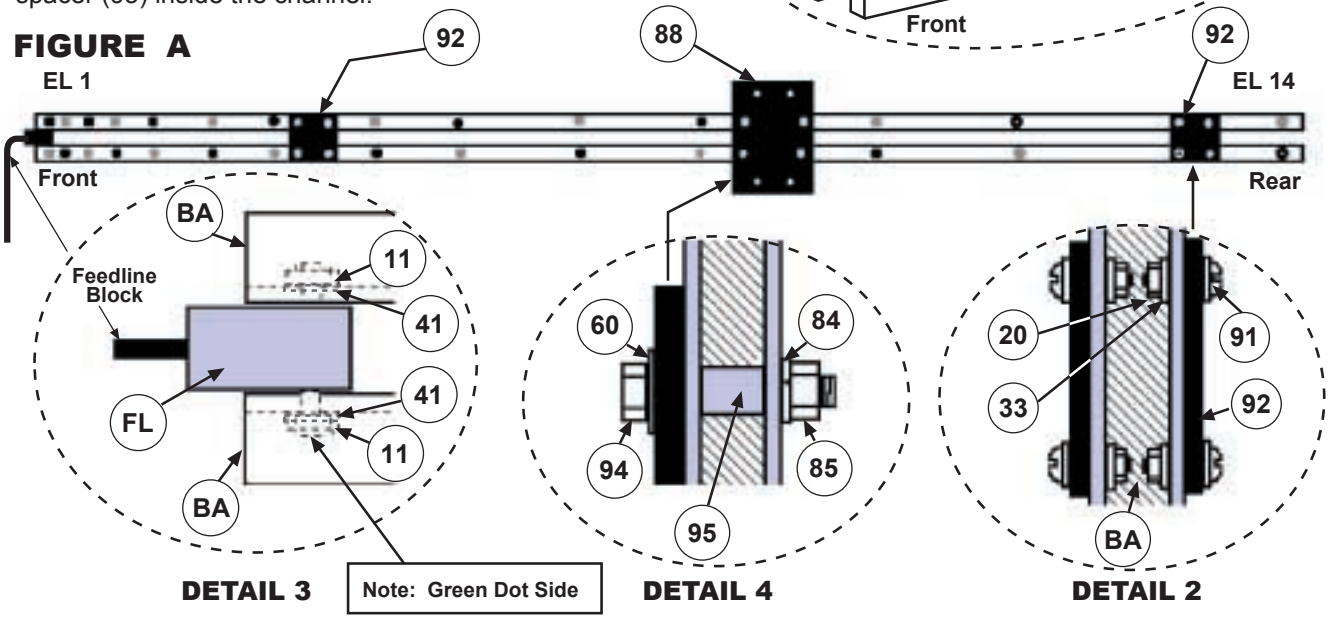


FIGURE A



Check and tighten all hardware.

KEY	P/N	DISPLAY	DESC	SIZE	QTY
BA	ASL-670BA		BOOM ASSEMBLY	1" x 1" x 80" (2.54 x 2.54 x 203.2 cm)	2
FL	ASL-670FL		FEEDLINE ASSEMBLY	—	1
4	010104		SS FLAT WASHER	1/4" (.64 cm)	4
11	010011		SS HEX NUT	8-32	2
20	010220		SS HEX NUT	10-24	16
33	010233		SPLIT LOCK WASHER	# 10	16
41	011941		SPLIT LOCK WASHER	# 8	2
60	015060		SS FLAT WASHER	# 10	16

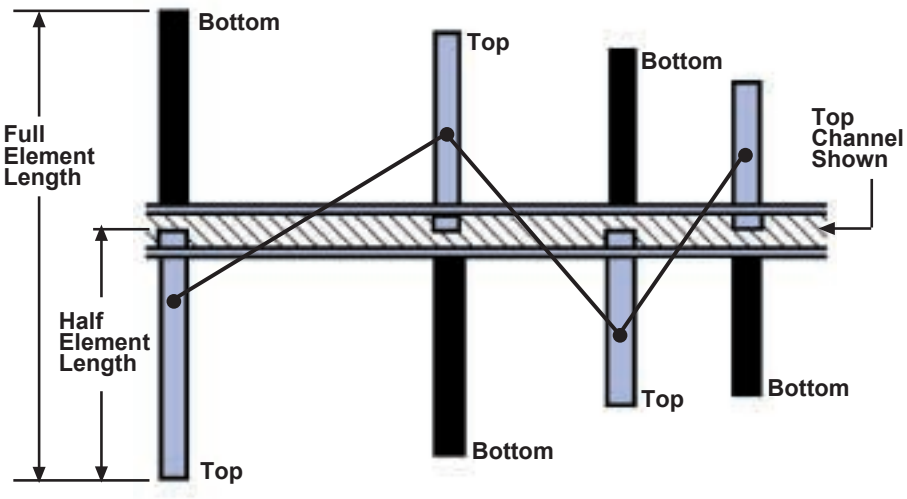
KEY	P/N	DISPLAY	DESC	SIZE	QTY
84	010084		SPLIT LOCK WASHER	1/4" (.64 cm)	4
85	010085		SS HEX NUT	1/4" - 20 (.64 cm)	4
88	205188		LPA MOUNTING PLATE	—	1
91	015291		SS MACHINE SCREW	10-24 x 5/8" (1.59 cm)	16
92	205292		LPA SPACER PLATE	—	4
94	015294		SS HEX BOLT	1/4" - 20 x 1-3/4" (.64 - 20 x 4.45 cm)	4
95	325295		ALUMINIUM SPACER	3/8" x 3/4" (.95 x 1.9 cm)	4

2. Log Periodic Element Mounting Pattern:

FIGURE B: Staggered Mounting Pattern

Each full element on the ASL670 consists of two half-sections. Each half-section is *stagger-mounted*. This means, if a half-element mounts in the top boom channel, its companion half-element must mount in the bottom boom channel on the opposite side. Also, if a full element occupies one pair of holes, the *next* element must occupy the opposite pair (refer to **Figure-B**). This staggered (or alternating) mounting pattern is needed to reverse the phase of each element by 180-degrees. Holes are drilled in both sides of the boom, so you must use caution and select the correct pair when mounting each element.

Important Note: You must adhere to this alternating mounting pattern when installing element sections for the antenna to work properly!



3. Mounting Rear Telescoping Elements EL14, EL13:

The two longest elements are mounted toward the rear of the boom. Find four (4) 1/2" x 46" element sections (13), and four (4) 3/8" x 22" extension tubes (14).

Locate the rear-most 1/2" dia. hole of the top rail and install a 1/2" x 46" element tube (13) as shown in **Figure-C**. Secure in place with a 8-32 x 1" screw. Using the companion set of holes in the bottom rail, install a 1/2" x 46" tube from the opposite side. Secure as above.

Slip a worm clamp (7) over the slotted end of both 1/2" tubes and insert a 22" x 3/8" telescoping element section in each (13).

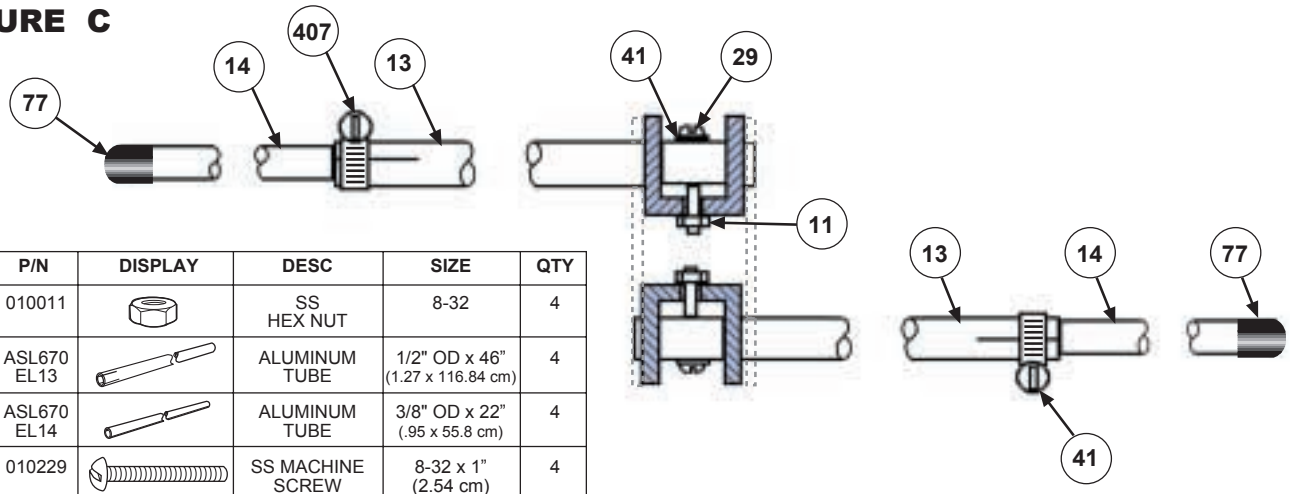
Adjust each half-element for 65"--as measured from its tip to side of the boom--and secure the worm clamps. Tip-to-tip span for EL 14 should measure 131".

Move forward to the next pair of 1/2" mounting holes and install the remaining 1/2" x 46" tubes, *stagger mounting them from the first pair*. Secure in place as above.

Install the remaining worm clamps and 22" x 3/8" telescoping extensions, and adjust each half-element for 53" tip-to-boom.

Secure the worm clamps. Tip-to-tip span for EL13 should measure 107". Install black plastic end caps on each tip (77).

FIGURE C



KEY	P/N	DISPLAY	DESC	SIZE	QTY
11	010011		SS HEX NUT	8-32	4
13	ASL670 EL13		ALUMINUM TUBE	1/2" OD x 46" (1.27 x 116.84 cm)	4
14	ASL670 EL14		ALUMINUM TUBE	3/8" OD x 22" (.95 x 55.8 cm)	4
29	010229		SS MACHINE SCREW	8-32 x 1" (2.54 cm)	4
41	011941		SS SPLIT LOCK WASHER	#8	4
77	050077		PLASTIC END CAP	3/8" OD x 7/8" (.95 x 2.2 cm)	4
407	030407		SS WORM CLAMP	7/32" (.56 cm)	4

Qty	Part #	El #	Tip-to-Rail	Tip-to-Tip
4	ASL670EL13	EL13	53" (134.6 cm)	107" (271.8 cm)
4	ASL670EL14	EL14	65" (165.1 cm)	131" (332.7 cm)

4. Installing 1/4” Threaded-Rod Element Sections:

The remaining 24 half-element sections are made from 1/4" solid aluminum rod with one end back-threaded approximately 1". Before beginning installation, pair these rods according to length. ASL670EL12 will be the longest pair, and ASL670EL1 will be the shortest. While not adjustable over a wide range, the 1" thread on each allows minor length correction--as needed--to match the tip-to-rail lengths listed on element chart **Figure-E**. Begin installation with the longest pair (ASL670EL12), and work from the back of the antenna toward the front--continuing the same staggered mounting pattern. Refer to **Figure-D** for mounting details and **Figure-E** for element length.

Install a 1/4-20 nut on the first rod (ASL670EL12), and spin about 3/4 of the way down the thread. Insert this rod into the correct mounting hole and secure finger-tight with a 1/4" lock washer and a second 1/4-20 nut.

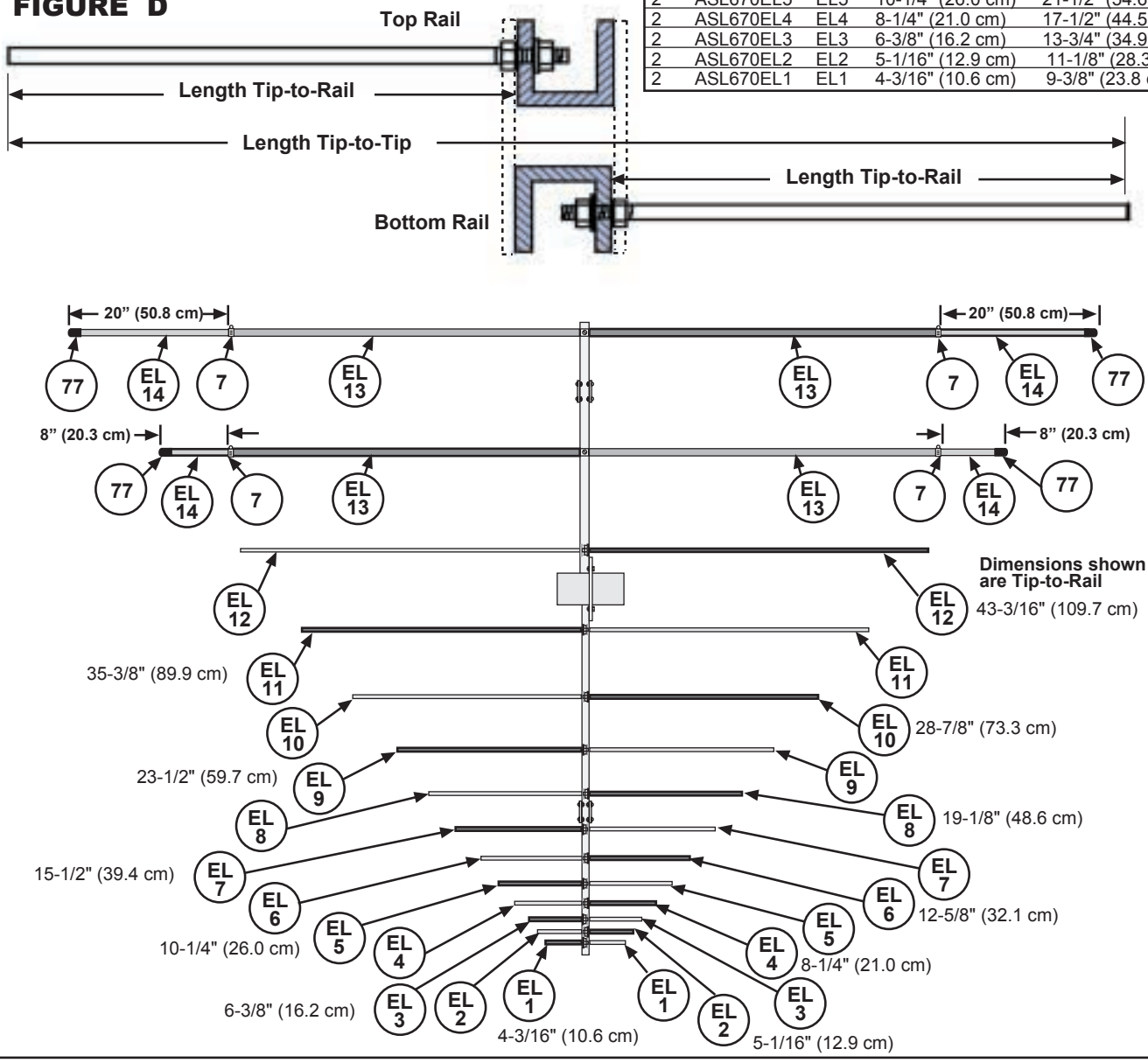
Adjust to the tip-to-rail length specified in **Figure E** and secure hardware. Insert the opposing half-element in the bottom rail, adjust for length, and secure. Tip-to-tip length for EL12 should be 87-3/8".

Install the remaining elements, referring to **Figure-E**. ***Be sure to continue the staggered mounting pattern throughout.***

Figure-E Rod-Element Length Chart:

Qty	Part #	El #	Tip-to-Rail	Tip-to-Tip
2	ASL670EL12	EL12	43-3/16" (109.7cm)	87-3/8" (221.9 cm)
2	ASL670EL11	EL11	35-3/8" (89.9 cm)	71-3/4" (182.2 cm)
2	ASL670EL10	EL10	28-7/8" (73.3 cm)	58-3/4" (149.2 cm)
2	ASL670EL9	EL9	23-1/2" (59.7 cm)	48" (121.9 cm)
2	ASL670EL8	EL8	19-1/8" (48.6 cm)	39-1/4" (99.7 cm)
2	ASL670EL7	EL7	15-1/2" (39.4 cm)	32" (81.3 cm)
2	ASL670EL6	EL6	12-5/8" (32.1 cm)	26-1/4" (66.7 cm)
2	ASL670EL5	EL5	10-1/4" (26.0 cm)	21-1/2" (54.6 cm)
2	ASL670EL4	EL4	8-1/4" (21.0 cm)	17-1/2" (44.5 cm)
2	ASL670EL3	EL3	6-3/8" (16.2 cm)	13-3/4" (34.9 cm)
2	ASL670EL2	EL2	5-1/16" (12.9 cm)	11-1/8" (28.3 cm)
2	ASL670EL1	EL1	4-3/16" (10.6 cm)	9-3/8" (23.8 cm)

FIGURE D

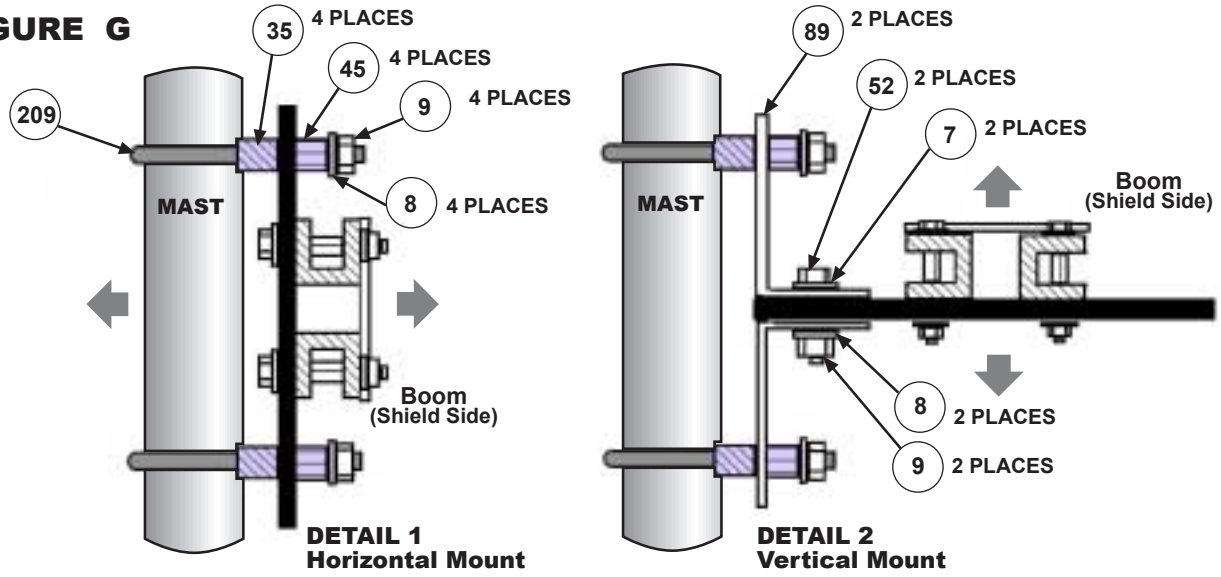


6. Antenna Mounting:

The ALS670 is supplied with mounting hardware for horizontal or vertical polarization. For horizontal polarization, install the two U-bolt mounting clamp assemblies as shown in **Figure G, Detail-1.** When mounting the antenna horizontally, position the shield-side rail down and run the cable down the mast.

For vertical installation, install the two truss brackets (89) in using 3/8" x 1" bolts, as shown in **Figure G, Detail-2**. Orient the shield side of the antenna boom toward the truss brackets. Finally, install the U-bolt mounting clamps on the truss brackets, as shown.

FIGURE G



5. Feedline Routing:

To prevent detuning the antenna, the feedline must be routed back to LPA mounting bracket along the inside of the boom channel that is connected to the coax cable's shield.

Identify the boom channel connected to the coaxial cable's shield. The ASL670FL feedline block should display a mark or sticker indicating the correct side. If, for any reason it does not, you may use an ohmmeter to identify the shield side.

Form a stress-relief loop in the coax, as shown in **Figure-F**, then route the coax back to the LPA mounting plate inside the shielded rail.

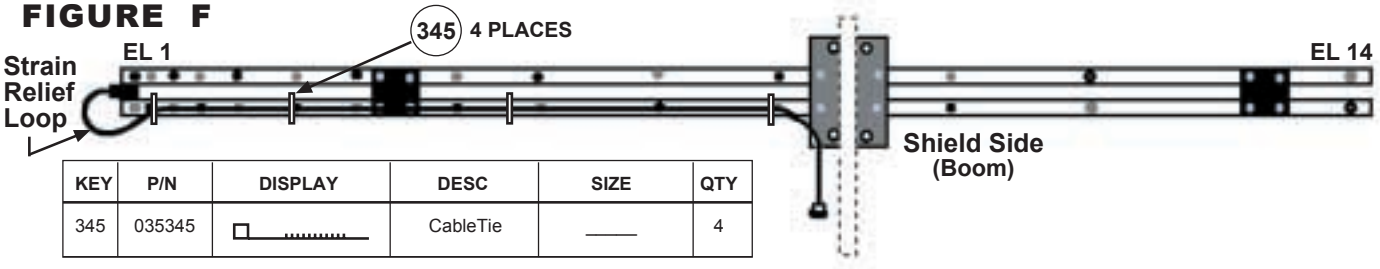
KEY	P/N	DISPLAY	DESC	SIZE	QTY
7	010207		FLAT WASHER	.391" (.99 cm)	2
8	010208		SPLIT LOCK WASHER	3/8" (.95 cm)	6
9	010209		HEX NUT	3/8"-16 (.95 cm)	6
35	170035		MAST V-BLOCK	9/16" x 3-1/2" (.43 x 8.89 cm)	2
45	321045		ALUMINIUM SPACER	1/2" x 5/16" (1.27 x .79 cm)	4
52	014952		HEX BOLT	3/8"-16 x 1" (.95 x 2.54 cm)	2
89	195189		TRUSS BRACKET	—	2
209	013209		U-BOLT	3/8"-16 x 4" (.95 x 10.16 cm)	2

Secure the line in place with plastic tie wraps threaded through unused element-mounting holes.

Do not over tighten the tie wraps, as this may crimp and damage the coax cable.

Important Warning: Do not run feedline along the rail connected to its center conductor. This will detune the antenna and deteriorate performance!

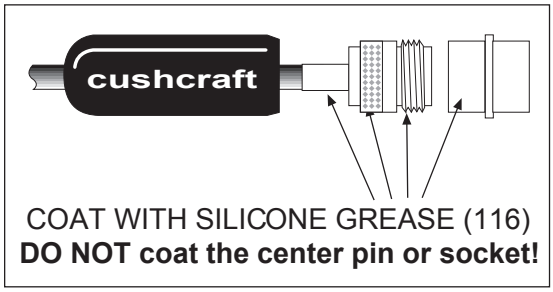
FIGURE F



KEY	P/N	DISPLAY	DESC	SIZE	QTY
345	035345		CableTie		4

7. Feedline Connection

Your ASL670 feedline assembly (FL) provides a pre-installed vinyl weather boot to protect the main feedline connection from moisture. Before connecting, coat the female N connector threads and cable jacket behind it with a thin film of silicone grease (116). Do not allow grease to contaminate the inside of the connector or center pin. When coated, install your feedline to the antenna N connector and slip the boot over the connection.



COAT WITH SILICONE GREASE (116)
DO NOT coat the center pin or socket!

KEY	P/N	DISPLAY	DESC	SIZE	QTY
116	240116		SILICONE PACKAGE	___	1
26	290326		DANGER LABEL	___	1

Note; Your antenna comes with a danger label (290326). Please attach this label to your antenna where you feel it will recieve the most visibility. One suggestion is that you wrap it around the feedline assembly and channel it runs in.

SPECIFICATIONS

MODEL	**ASL670**
Frequency:	**50 - 500 MHz, Continuous Coverage**
Number Of Elements:	**14**
Forward Gain:	**6.5 dBi 4.4 dBd**
Front-to -Back Ratio:	**20 dB**
SWR:	**1.5:1 Average**
Power Rating, Watts PEP:	**300**
Boom Length:	**6'- 8" (2.03 m)**
Boom Size:	**1"x 2.75" (2.54 x 7 cm)**
Longest Element:	**126.6" (3.22 m)**
Turning Radius Horizontal Mtg.:	**6'- 3" (1.9 m)**
Turning Radius Vertical Mtg.:	**3'- 9" (1.15 m)**
Mast Size:	**1.5 - 2.5" (3.8 cm - 6.4 cm)**
Wind Load:	**3.0 sq. ft. (.28 sq. m)**
Weight:	**11-1/4 lbs. (5.1 kg)**
Hardware:	**Stainless Steel**

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