

JAMPRO ANTENNAS, INC.

**WESTERN RESERVE PUBLIC MEDIA
NORTHEASTERN EDUCATION TELEVISION
OF OHIO, INC.**

JSL-2/13-SEO-V

CH.13, 210-216 MHZ

SEPTEMBER 6, 2019

SERIAL #19545-A





6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

INTRODUCTION

The JAMPRO slot television antenna is designed for use on a TV channel as stated in the electrical specification of the order. This type of antenna is available with various patterns, input powers, and TV bands. The input power rating to the antenna, as supplied, is shown on the order.

The power rating indicated is the peak visual power ratings and include 20% aural power.

Refer to the drawings and specifications sheet to determine the input size and power rating of this antenna.

This booklet does not cover the technical design of this slot antenna. The purpose of the book is to enable the rigging personnel to understand the antenna and recommend methods of installing and care of the slot antenna. Refer to JAMPRO technical data catalog pertaining to slot-type antennas.



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ANTENNA SPECIFICATIONS

MODEL: JSL-2/13-SEO-V **SERIAL NO.:** 19545-A

ELECTRICAL SPECIFICATIONS

CHANNEL: 13 (210-216 MHz)

POLARIZATION: Elliptical

AZIMUTH PATTERN: Omni

AVERAGE GAIN: H-Pol: 1.40x / 1.46 dBd
V-Pol: 0.60x / -2.22 dBd

BEAM TILT: 0°

NULL FILL: 5%

INPUT POWER: 2 kW

INPUT IMPEDANCE: 50 ohms, Nominal

ANTENNA VSWR: 1.1:1 or better

ELECTRICAL DE-ICER: none

INPUT CONNECTION: 1-5/8" EIA (f)

MECHANICAL/ENVIRONMENTAL SPECIFICATIONS

WEIGHT: 277 lbs. (126 kg), no ice

EFFECTIVE PROJECTED AREA (EPA): 17 ft² (1.6 m²), no ice, per TIA-222-G

PRESSURIZATION: 10 psi max, 3–5 psi operating

ANTI-ICING PROTECTION: Radome

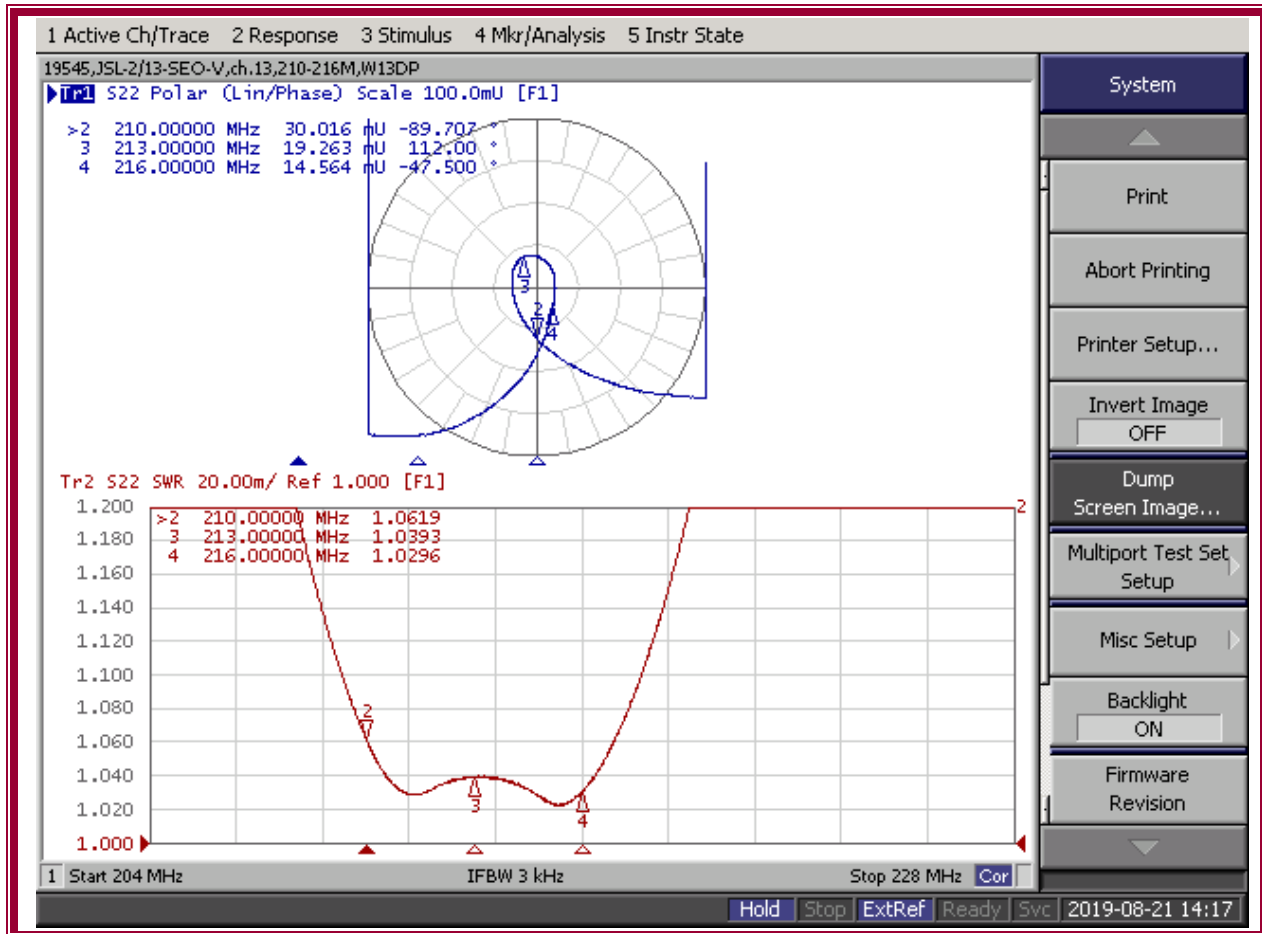


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COMPLEX INPUT IMPEDANCE DATA PLOT

VSWR DATA PLOT

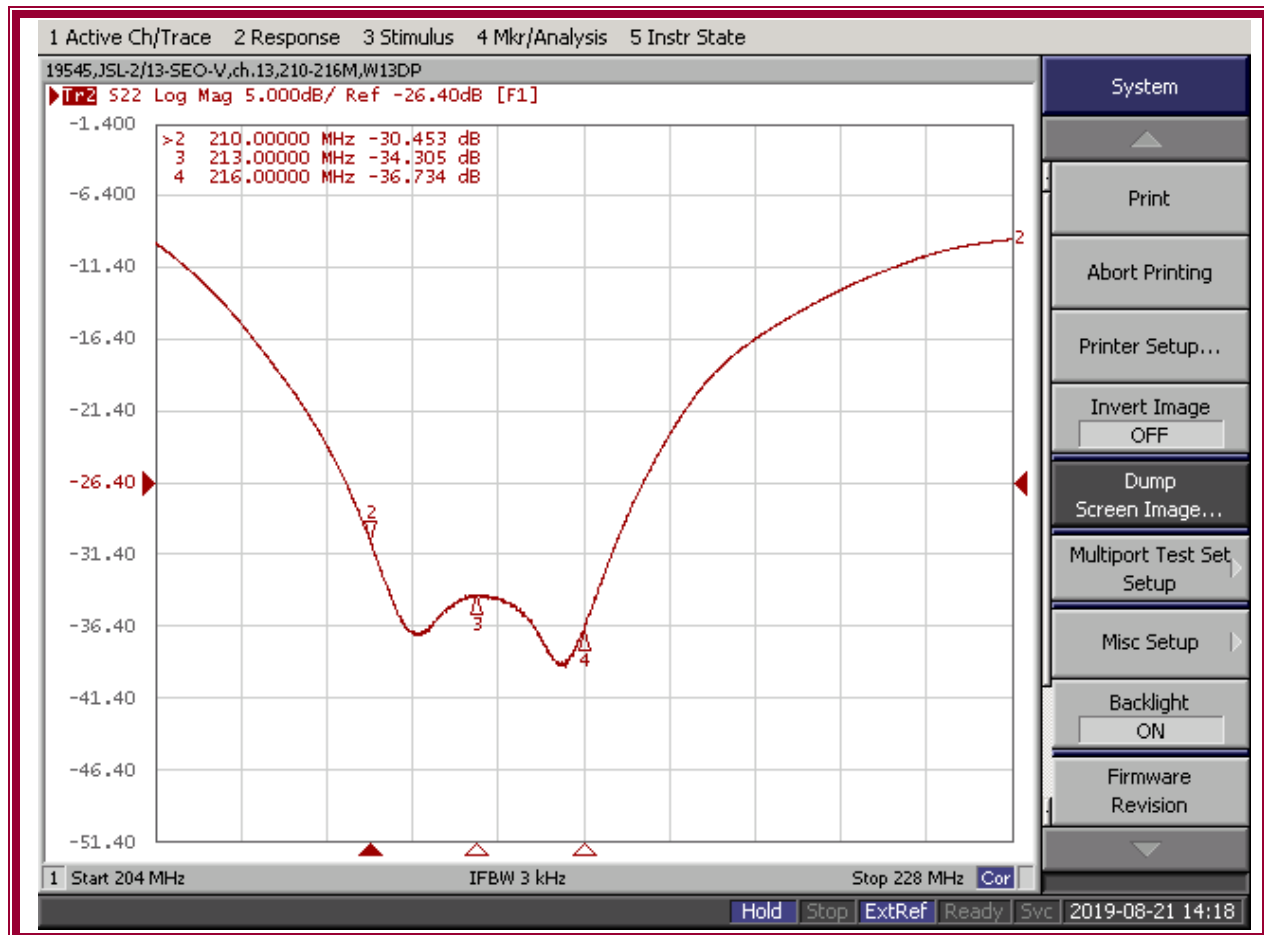




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RETURN LOSS DATA PLOT

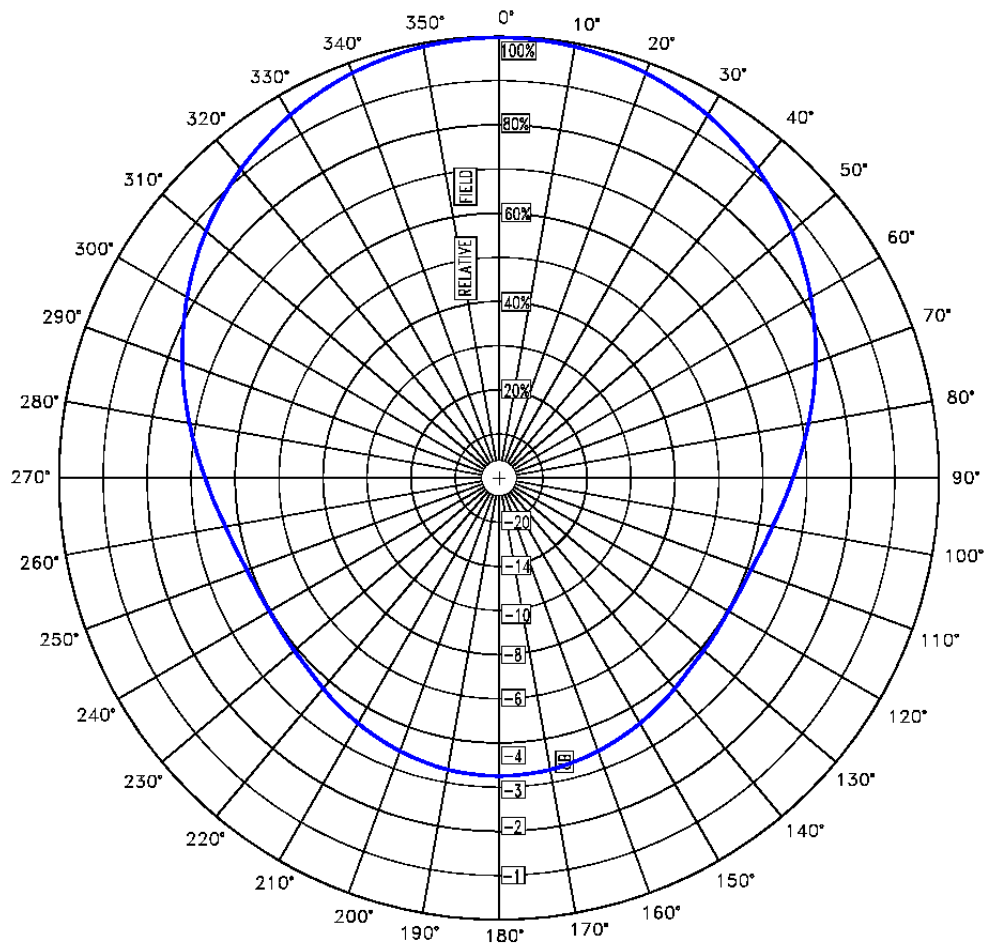




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AZIMUTH PATTERN PLOT



NOTE: ANTENNA PATTERN SHOWN IS UN-ROTATED
STATION MANAGER IS TO DETERMINE ACTUAL ANTENNA / PATTERN ORIENTATION



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AZIMUTH PATTERN TABULATION



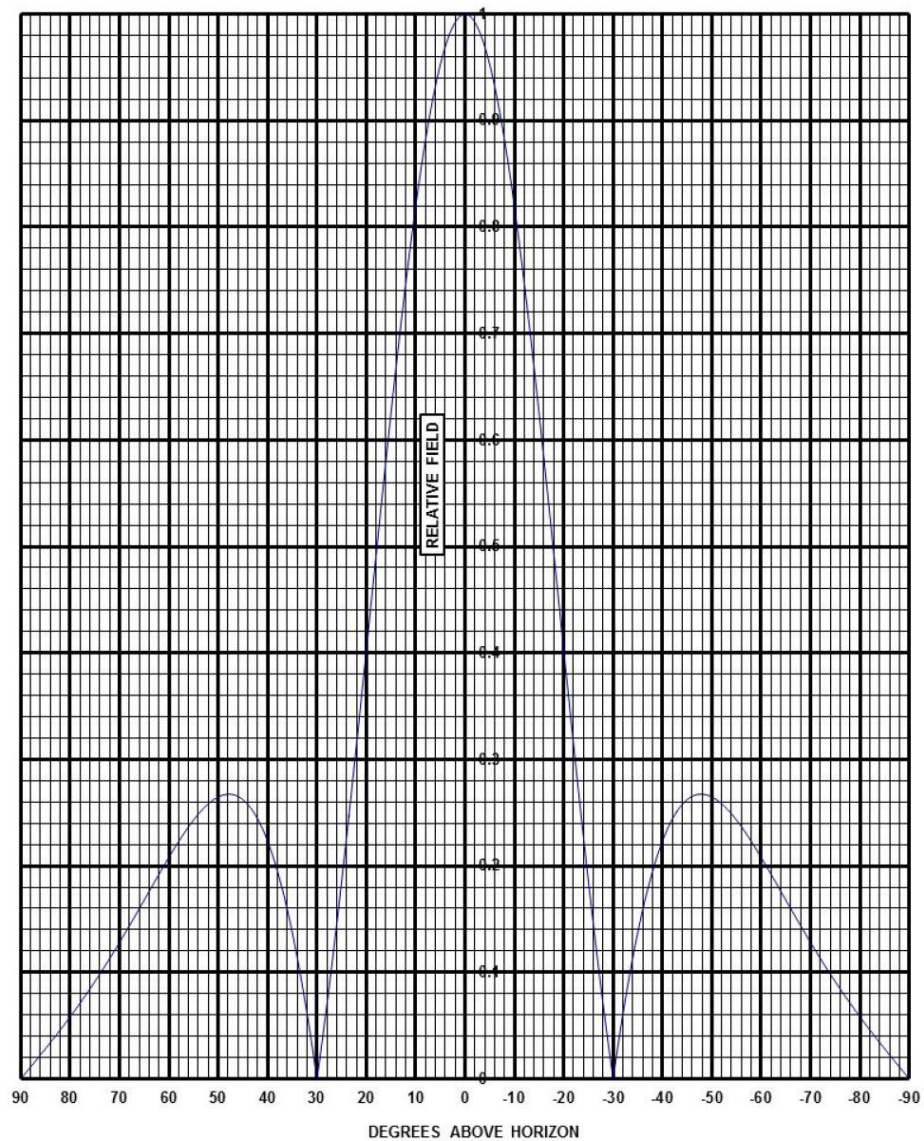
<u>AZIMUTH</u>	<u>FIELD</u>	<u>dB</u>
0	1.000	0.00
10	0.994	-0.05
20	0.978	-0.19
30	0.951	-0.44
40	0.915	-0.77
50	0.871	-1.20
60	0.820	-1.72
70	0.767	-2.30
80	0.715	-2.91
90	0.668	-3.50
100	0.631	-4.00
110	0.609	-4.31
120	0.602	-4.41
130	0.608	-4.32
140	0.623	-4.11
150	0.642	-3.85
160	0.659	-3.62
170	0.672	-3.45
180	0.676	-3.40
190	0.672	-3.45
200	0.659	-3.62
210	0.642	-3.85
220	0.623	-4.11
230	0.608	-4.32
240	0.602	-4.41
250	0.609	-4.31
260	0.631	-4.00
270	0.668	-3.50
280	0.715	-2.91
290	0.767	-2.30
300	0.820	-1.72
310	0.871	-1.20
320	0.915	-0.77
330	0.951	-0.44
340	0.978	-0.19
350	0.994	-0.05



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ELEVATION PATTERN PLOT

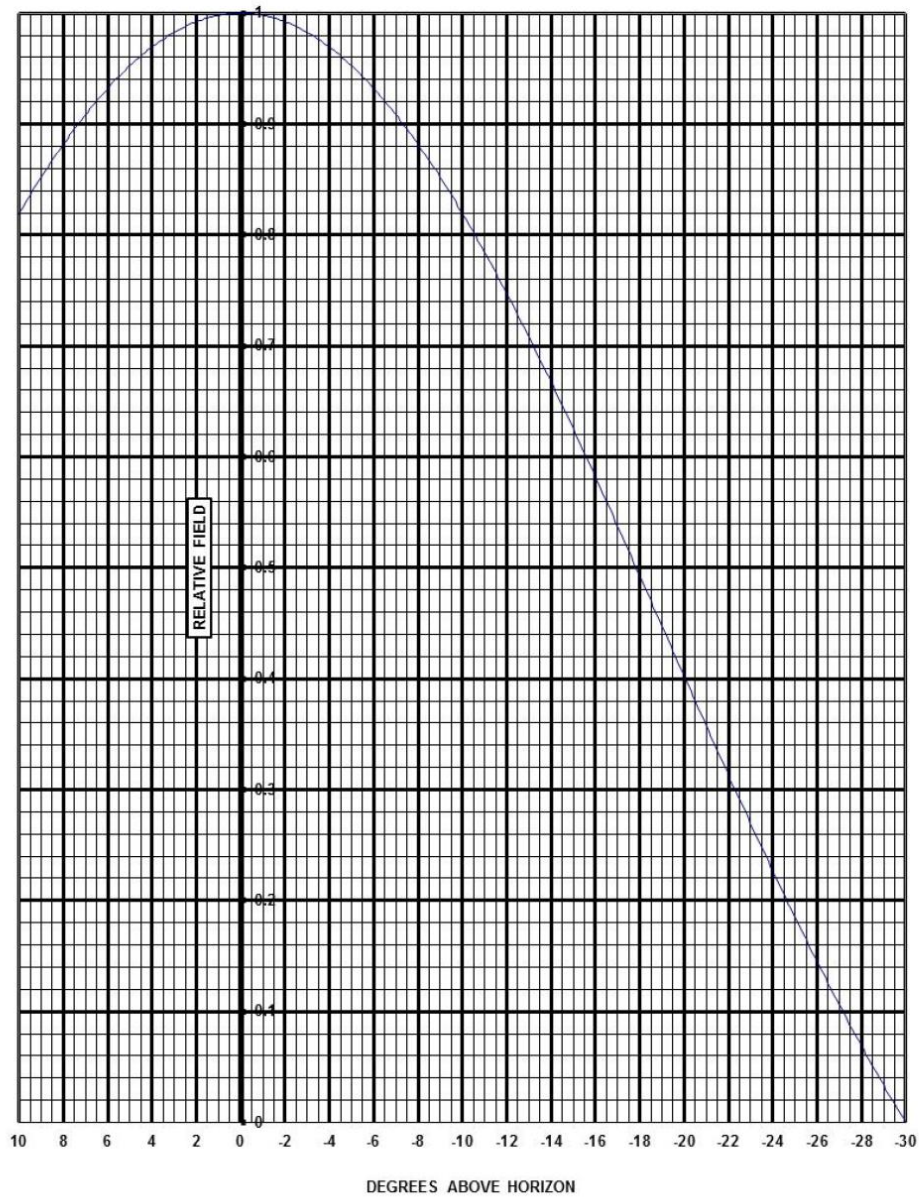




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ELEVATION PATTERN – EXPANDED PLOT





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ELEVATION PATTERN DATA TABULATION



Elevation Pattern Tabulation

RELATIVE FIELD VS ELEVATION ANGLE

<u>ELEVATION ANGLE</u>	<u>RELATIVE FIELD</u>	<u>ELEVATION ANGLE</u>	<u>RELATIVE FIELD</u>	<u>ELEVATION ANGLE</u>	<u>RELATIVE FIELD</u>
10	0.820	-26	0.145	-61	0.200
9	0.852	-27	0.106	-62	0.192
8	0.882	-28	0.069	-63	0.184
7	0.909	-29	0.034	-64	0.176
6	0.932	-30	0.000	-65	0.168
5	0.953	-31	0.032	-66	0.160
4	0.970	-32	0.061	-67	0.152
3	0.983	-33	0.089	-68	0.144
2	0.992	-34	0.114	-69	0.136
1	0.998	-35	0.138	-70	0.128
0	1.000	-36	0.159	-71	0.120
-1	0.998	-37	0.178	-72	0.113
-2	0.992	-38	0.195	-73	0.106
-3	0.983	-39	0.210	-74	0.098
-4	0.970	-40	0.223	-75	0.091
-5	0.953	-41	0.235	-76	0.084
-6	0.932	-42	0.244	-77	0.078
-7	0.909	-43	0.252	-78	0.071
-8	0.882	-44	0.258	-79	0.065
-9	0.852	-45	0.262	-80	0.058
-10	0.820	-46	0.265	-81	0.052
-11	0.785	-47	0.267	-82	0.046
-12	0.747	-48	0.267	-83	0.040
-13	0.708	-49	0.267	-84	0.034
-14	0.667	-50	0.265	-85	0.028
-15	0.625	-51	0.262	-86	0.022
-16	0.582	-52	0.258	-87	0.017
-17	0.538	-53	0.254	-88	0.011
-18	0.493	-54	0.249	-89	0.006
-19	0.448	-55	0.243	-90	0.000
-20	0.403	-56	0.237		
-21	0.358	-57	0.230		
-22	0.313	-58	0.223		
-23	0.270	-59	0.216		
-24	0.227	-60	0.208		
-25	0.185				



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UNPACKING

EQUIPMENT SUPPLIED

The equipment furnished normally includes support mounting brackets and slot antenna.

RECEIVING AND ANTENNA INSPECTION

Upon receipt of the antenna system, the boxes and packing should be thoroughly checked against the packing list for completeness. The antennas miscellaneous items should be unpacked and thoroughly inspected for damage.

Any materials found to be missing or damaged should be noted, and JAMPRO ANTENNAS, INC. should be notified for disposition. File a shipper damage report with the shipping company. It is recommended that the antenna installation not be started until all the hardware is on site to prevent any down time during installation.



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PACKING LIST

Date: 26-Aug-19

PACKING LIST
19545-A
JSL-2/13 SEO-V
WHFL-TV

ITEM #	QTY (req spare)	MODEL #	DESCRIPTION	BOX #	Q/A
1	2	nnp	Instruction Manual	2	DH
2	1	19545-A-010	JSL-2/13 SEO-V Radiating Element	1	JP
3	1	19545-A-015	Input Transformer w/ Elbow	2	
4	1	19545-A-020	3-1/8" Fine Matcher w/Reducer to 1-5/8"	2	
5	2	19545-A-025	Slot Mounting Bracket	2	
6	4/1	207-00014-00	SS Bolt, 1/2" x 1-1/2"	2	
7	4/1	225-00001-00	SS LW, 1/2"	2	
8	4/1	236-00001-00	SS Nut, 1/2"	2	
9	2	149-00061-00	SS Slot Shim	2	
10	6/1	206-00016-00	SS Bolt, 3/8" x 1-3/4"	2	
11	6/1	206-00014-00	SS Bolt, 3/8" x 1-1/2"	2	
12	12/1	224-00001-00	SS LW, 3/8"	2	
13	12/1	235-00001-00	SS Nut, 3/8"	2	
14	1	073-00001-99	3-1/8" Anchor Insulator	2	
15	2	774-00340-00	3-1/8" O-Ring	2	
16	4/1	205-00014-00	SS Bolt, 5/16" x 1-1/2"	2	
17	4/1	223-00001-00	SS LW, 5/16"	2	
18	4/1	234-00001-00	SS Nut, 5/16"	2	
19	1	774-00328-00	1-5/8" O- Ring	2	
20	2	077-00024-00	HDG Saddle Bracket, 3-1/8" x 24"	2	
21	2	077-00029-00	HDG Cross Plate, 5" x 5"	2	
22	2	149-00018-45	SS Shim, 3-1/8"	2	
23	4	526-00048-00	SS Hose Clamp, 6848	2	
24	10	401-00013-01	HDG U-Bolt, 3/8" x 2-3/8"	2	
25	4	401-00006-01	HDG U-Bolt, 3/8" x 1-3/8"	2	
26	20/2	300-00002-00	HDG LW, 3/8"	2	
27	20/2	290-00002-00	HDG FW, 3/8"	2	
28	20/2	309-00001-00	HDG Nut, 3/8"	2	
29	2	777-00001-2G	Silicone Grease	2	JP DH



INSTALLATION PROCEDURES

INSTALLATION SEQUENCE

- 1) Inspect antenna for shipping damage.
- 2) Check components to packing list. Call JAMPRO if any parts are missing or damaged.
- 3) Lay out slot with radome down. Support at ends of bay with wood cribbing.
- 4) Install the rigid feed lines using bolts and O-rings (supplied). Verify proper line connected to proper bay. NOTE: Bays marked on top and bottom (e.g., Bay 1 marked T1 for top). IMPORTANT: Verify inner conductors are properly oriented. If installed properly, the antenna will have high VSWR.
- 5) Install mounting brackets according to installation drawing.
- 6) Hoist bay into place on tower.
- 7) Care should be exercised to prevent the antenna from striking the tower on its way up. Such bumps may damage the pole reflectors and/or radome. In such an event, the damaged part must be repaired or replaced.
- 8) Install the mounting bracket to the tower or pole using U-bolts supplied.
- 9) Pressurize the transmission line and antenna system and check for leaks. NOTE: The antenna system is pressurized up through and including the point where the rigid 15-inch long line sections connect to the slot flange feed inputs. A gas block seal is located inside the bays at that point. (Do not leave the job site if there is an air leak. Repair and call the factory).
- 10) Verify the following points:
 - a) Antenna is installed at proper heading (to be determined by chief engineer).
 - b) All bolts are tight.
 - c) All lines are properly secured to the tower, with no leaks.



MAIN TRANSMISSION LINE

It is extremely important that the transmission line be completely free from moisture before feeding RF power to the antenna. The line should be kept capped until other lines can be connected. A dehydrator or dry nitrogen may be used to pump dry air into the line. If the line is not free of moisture, arcing may occur, which will seriously damage the line and antenna. JAMPRO cannot be responsible for such damage under any circumstances. The customer should take all necessary steps to insure moisture- and water-free lines before and at all times of assembly.

The upper end should be connected to the antenna input feed line at the center of the antenna making sure the o-ring, properly lubricated, is put into place.

The rest of the line should be put on the tower with the hangers supplied for this purpose.

After the tower is dressed with the line, the remainder may be put into the building, and strapped down as required connecting to the rigid line section coming from transmitter. It is important that the main transmission line be tied down to the tower as recommended by the supplier.

The system may be tested for air leaks after the upper end is connected to the antenna. The air pressure may be increased to 10 pounds to facilitate air loss and leak detection.

If flex type line is used, it is also recommended that at the same time of the initial installation of the main coaxial transmission line, some slack may be put into the line at the very top of the tower, by an S shape routing. This will facilitate certain VSWR tests, which may be desired later. Hanger clamps, however, should support this slack.

AIR PRESSURE

After the main transmission line is hoisted and connected to the antenna, the entire system should be checked for leaks. This air loss will also indicate absence of O-rings or other problems.

Air leaks must be located and remedied. There should not be more than two pounds of air loss over 24 hours, observed at the same time each day (to allow for daily temperature changes). Any air leaks must be located and repaired, preferably before the riggers leave the installation site.

RETURN LOSS MEASUREMENT VSWR

Upon completion of the antenna installation and associated hardware, the antenna can be checked for VSWR. Test equipment should consist of a signal generator; directional coupler and VSWR read out meter to be used to make the VSWR tests. The system should be checked in several steps:



Step 1: Terminate the transmission lines just before entering the antenna system with proper loads. The transmission lines should read 32 dB down across the band.

Step 2: Check the line plus connected antenna for VSWR.

Step 3: The last and final test would be a complete system check of antenna system and transmission line measured from the transmitter room.

REFLECTOMETER READINGS

The transmitter reflectometers are relative reading devices and not accurate, since their directivity leaves a lot to be desired. The values read with the test equipment should be considered valid. The directivity of the couplers used should be 45 dB or better and the accuracy of reading the reflected power is very good, resulting in highly accurate readings. The transmitter reflectometer readings should be used as relative indicators only.

PERIODIC INSPECTIONS

An inspection of the antenna should be made after the first three months of operation, and once a year thereafter. In areas of high winds, inspection should be made as soon after the first heavy storm as conditions permit. Inspection should include the following:

1. Check all bolts for looseness and tighten if necessary.
2. All exposed surfaces, including the pole, should be inspected for paint or plating failure. Where failure spots are noticed, clean, and repaint.
3. The radomes should be free of dirt. Clean but do not paint radomes with any lead base paint. To do so will raise the VSWR of the antenna and perhaps burn out the antenna.

NOTE: The greatest safeguard for your antenna system is the continuous maintenance of positive air pressure inside the feed lines. Always locate air leaks as soon as possible and correct them. It is advisable to maintain a positive air pressure of 5 pounds per square inch, either through an automatic dehydrator or dry nitrogen cylinders.

When looking for leaks, the pressure may be increased to 8–10 pounds.

The warranty is void if the system is not pressurized at all times. If evidence of moisture is found inside the antenna components, this will void the antenna warranty.

NOTE: JAMPRO ANTENNAS, INC. is not responsible for the installation or the supervision of the antenna system. JAMPRO has supplied the slot antenna only. In no way is JAMPRO responsible for the method by which the antenna is to be installed.



WARNING

This antenna is supplied by JAMPRO ANTENNAS, INC. has certain dead and live load which are indicated in this manual. It is the purchaser's responsibility to determine if the supporting structure (tower, mast, pole, etc.) can safely hold this antenna, together with its transmission line, in the winds, snow and ice conditions which may prevail. It is strongly suggested by JAMPRO ANTENNAS, INC. that a structural engineer be consulted by the customer to determine the overall structural safety of the installation, with the addition of the antenna system.

WARNING

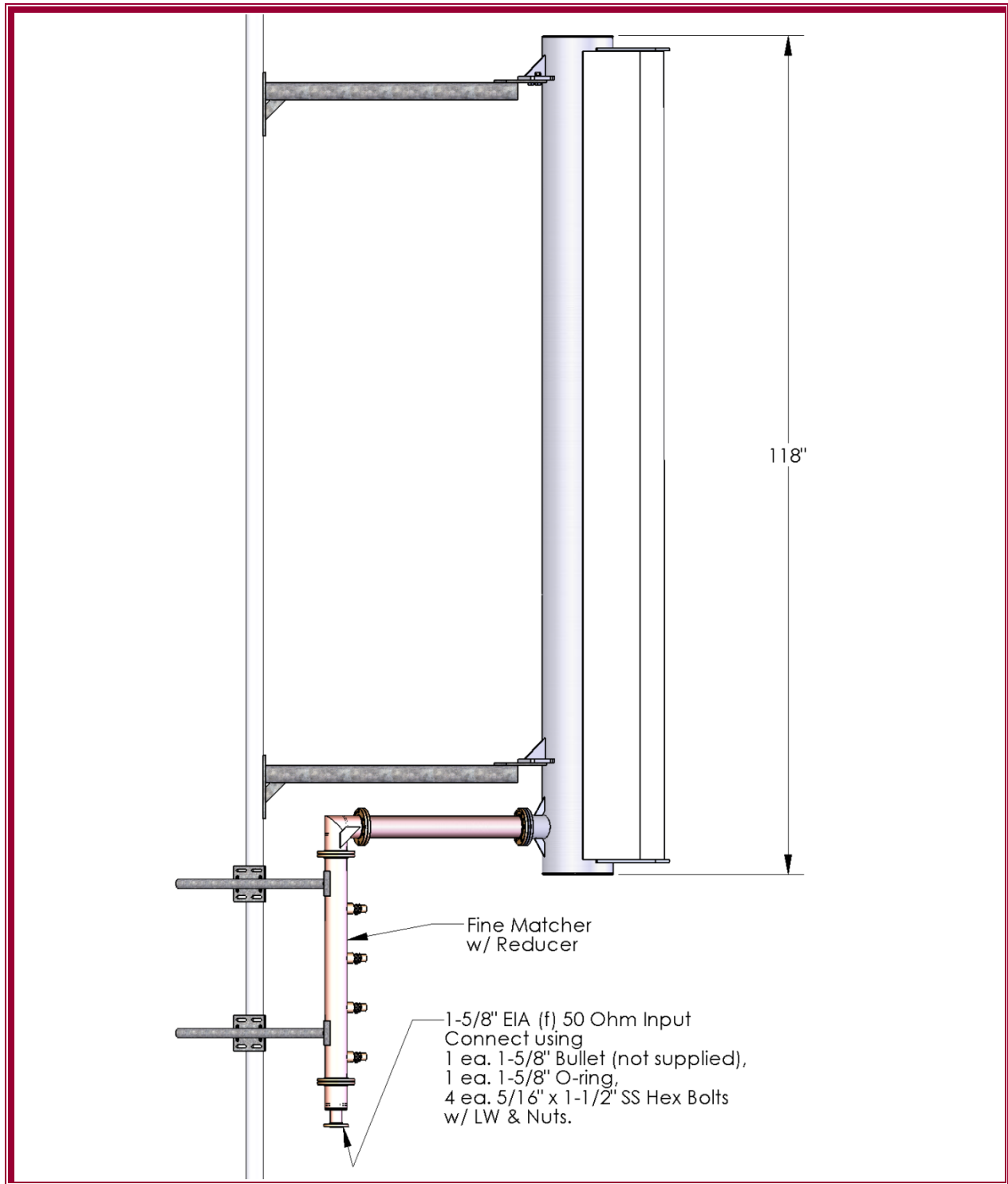
This antenna system, when energized by an RF transmitter can present potentially lethal high voltage and a high intensity RF field in its vicinity. Care should be taken to not touch or otherwise contact the antenna system when energized. It is not advisable to be in the antenna aperture while the antenna system is energized. All maintenance or repairs should be done with the primary voltage to the transmitter disconnected and all transmitter remote controls disabled.



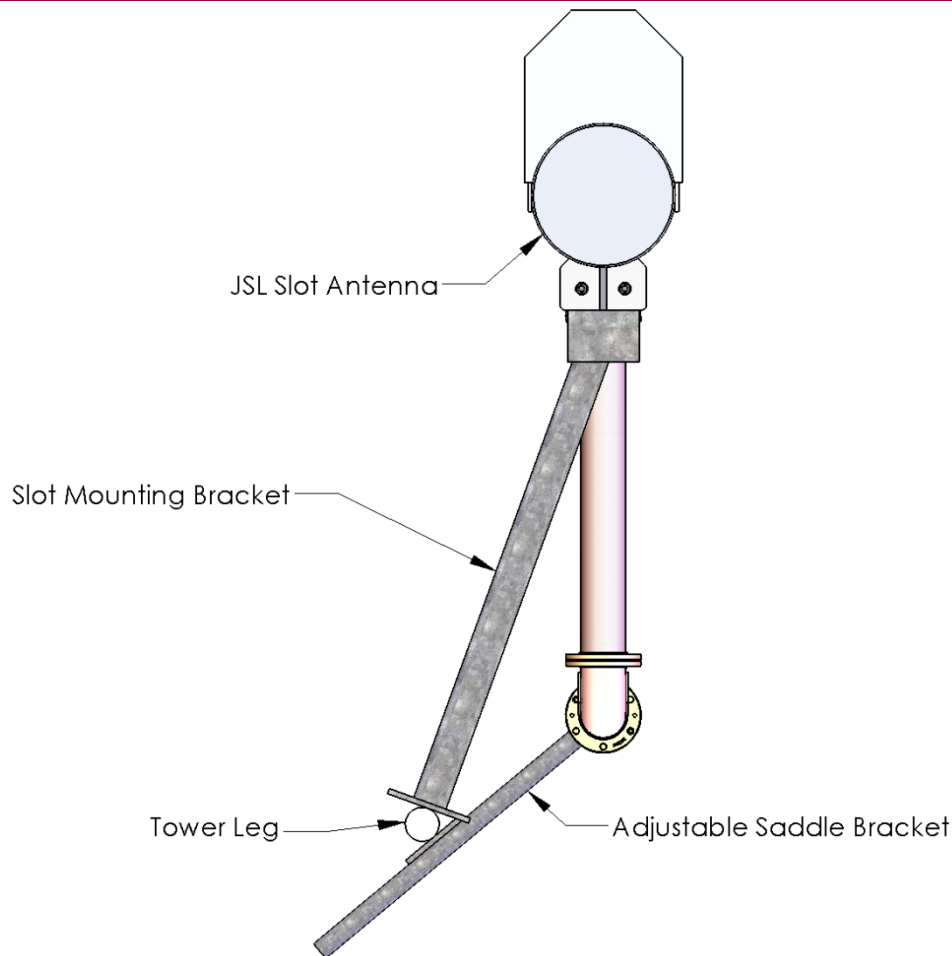
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ELEVATION VIEW



TOP VIEW

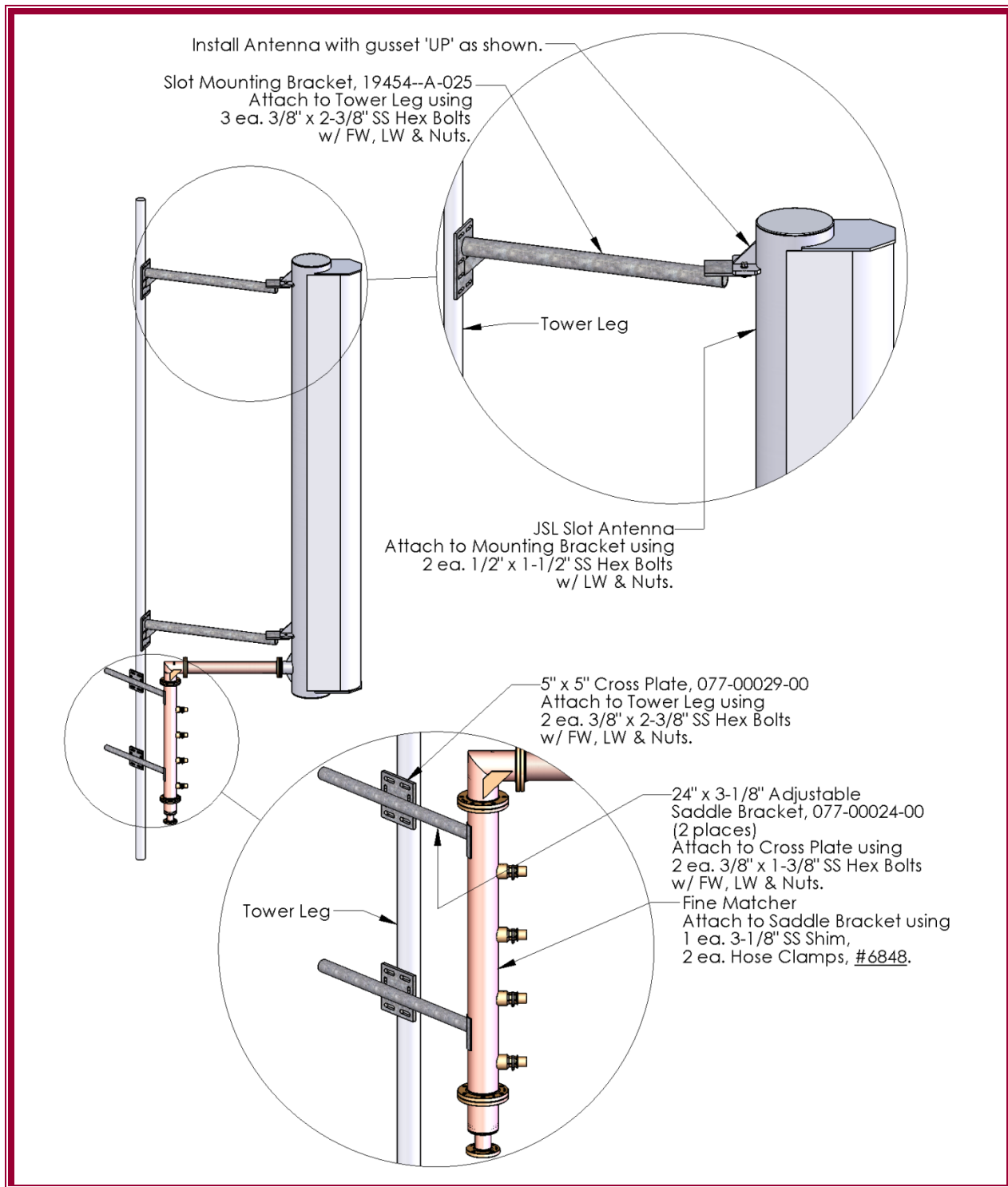


NOTES:

1. The slot antenna is shown unrotated and, unless otherwise noted, should not be construed as an indication of final heading.
2. The tower information was not available at the time of this publication.
3. The u-bolts supplied are for a 2-3/8" ϕ tower leg and may or may not be appropriate for use with a different size vertically-mounted structural member.
4. If the diameter of tower leg to be supplied is different than what the U-bolt can accommodate, the customer will then be responsible for supplying the proper connecting hardware.
5. The slot mounting bracket is designed with a 20° angle between the bracket boom and mounting plate.
6. The slot antenna must be installed on a vertically plumb tower leg as shown.
7. The antenna may be rotated around the tower leg as necessary, within the limits of the weldments and other obstructions, to achieve desired coverage.
8. If guy wires are present, use of glass rods or break-up insulators in guy wires is optional.
9. The Station Engineer is to determine the direction of the antenna for optimal performance.
10. Installing the antenna other than illustrated may affect performance.

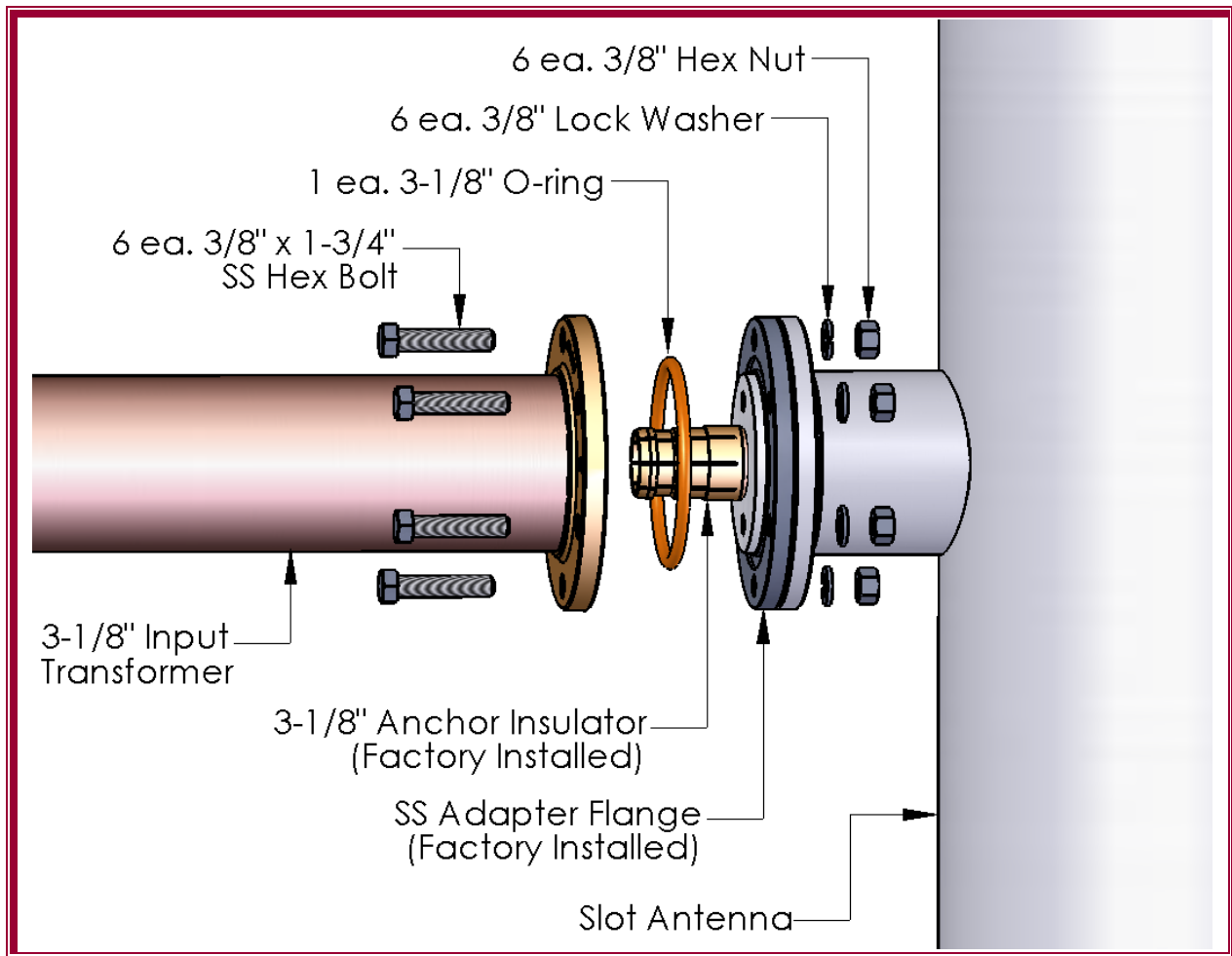


ANTENNA MOUNTING VIEW





3-1/8" INPUT TRANSFORMER MOUNTING VIEW

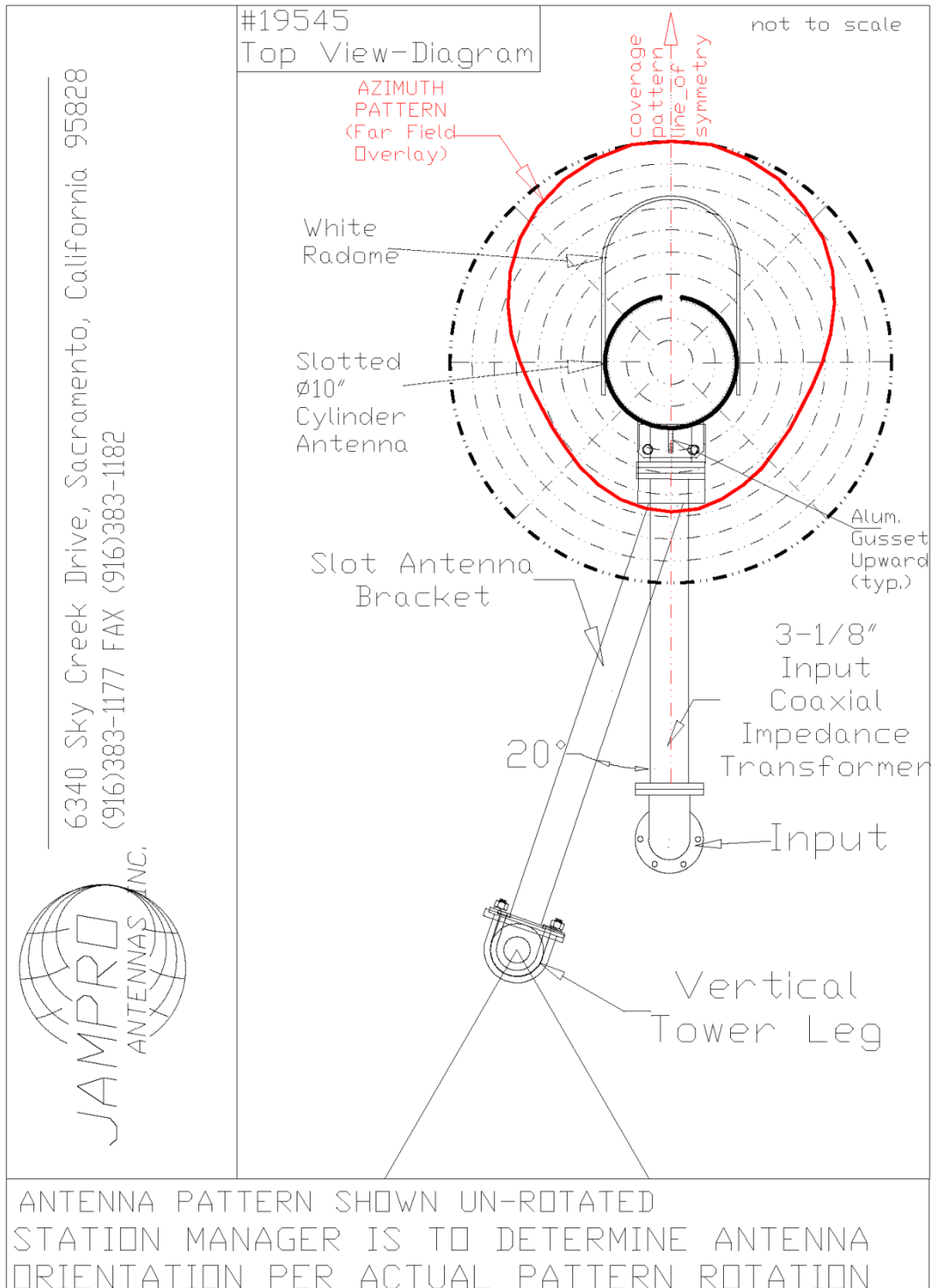




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TOP VIEW - DIAGRAM

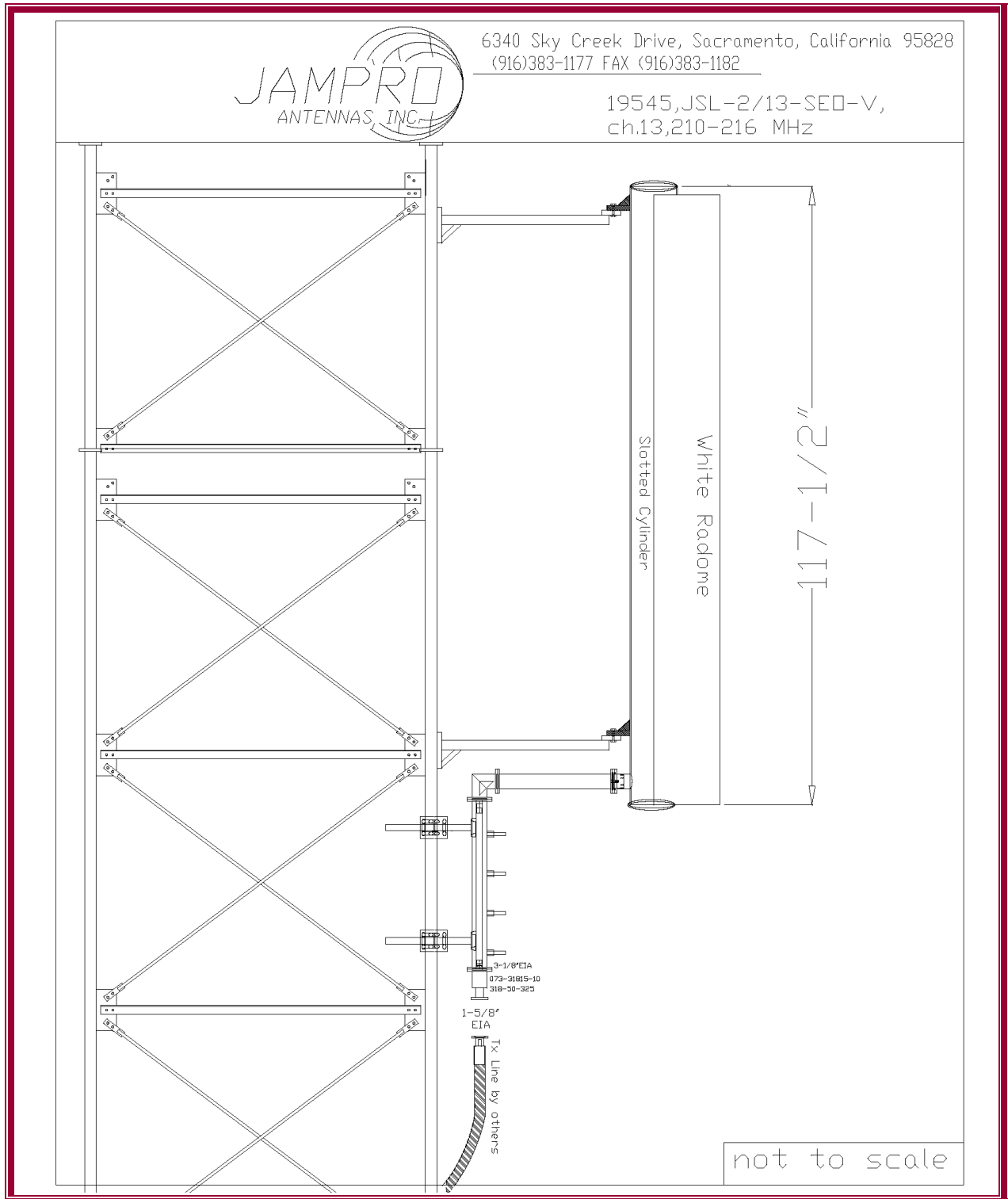




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SIDE VIEW - DIAGRAM

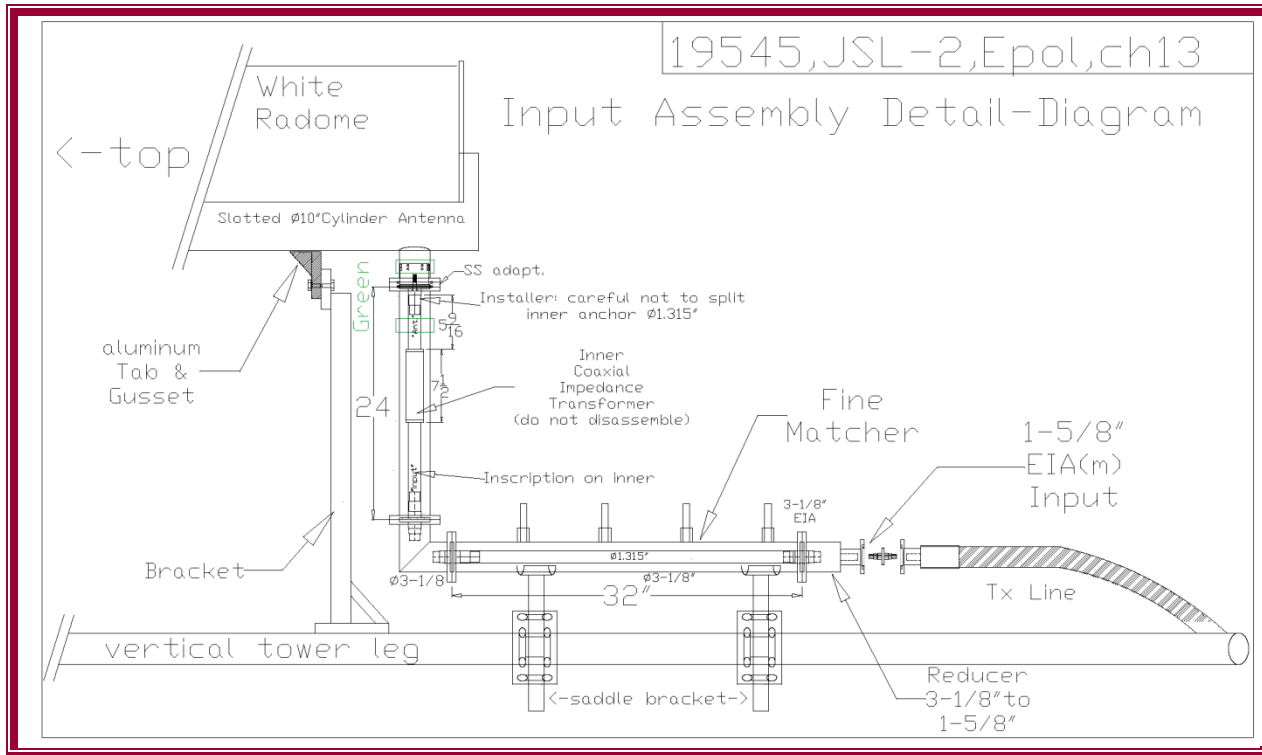




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INPUT DETAIL - DIAGRAM

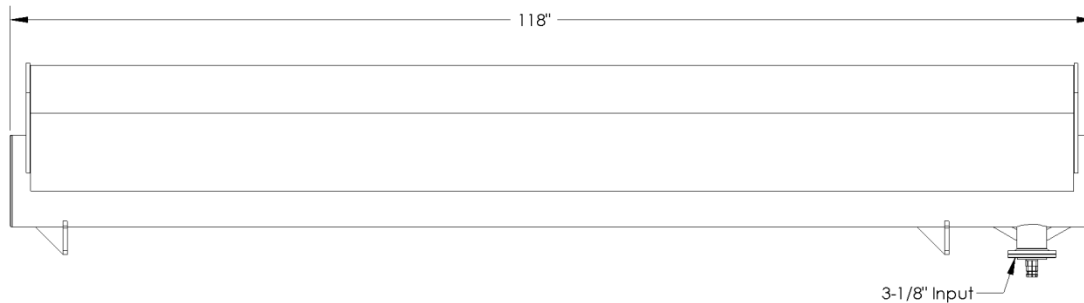
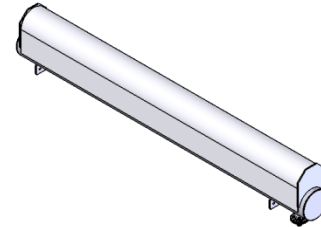




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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	19545-A-011	JSL-2/13-SEO-V OUTER WELD	1
2	19545-A-012	JSL-2/13-SEO-V END SHORT ASSY	1
3	19545-A-013	JSL-2/13-SEO-V SHORT ASSY	1
4	19545-A-107	JSL-2/13-SEO-V END CAP	2
5	19545-A-108	JSL-2/13-SEO-V 4" SLOT INNER	1
6	19545-A-109	JSL-2/13-SEO-V INPUT INNER SPACER	1
7	19545-A-110	JSL-2/13-SEO-V INPUT OUTER SPACER	1
8	19545-A-111	JSL-2/13-SEO-V INPUT INNER	1
9	19545-A-112	JSL-2/13-SEO-V FLANGE ADAPTOR	1
10	19545-A-113	JSL-2/13-SEO-V GAS BLACK TEFLON	1
11	19545-A-114	JSL-2/13-SEO-V INNER EXT	1
12	19545-A-118	JSL-4/7-V-SEO TO Dipole Block	4
13	19545-A-119	JSL-2/13-SEO-V Dipole	2
14	19545-A-120	JSL-2/13-SEO-V RADOME	1
15	055-00043-00	3-1/8" HALF BULLET MACHINED	1
16	005-00012-00	BOLTS HEX HD 3/8-16 x 1-1/4	2
17	224-00011-00	SS LOCK WASHER 3/8" FLUT	2
18	072-00019-00	O-RINGS 219	2
19	074-00034-00	O-RINGS SILICONE #568-334	2
20	074-00340-00	O-Ring Silicone, 568-340 (210 x 3.35)	1



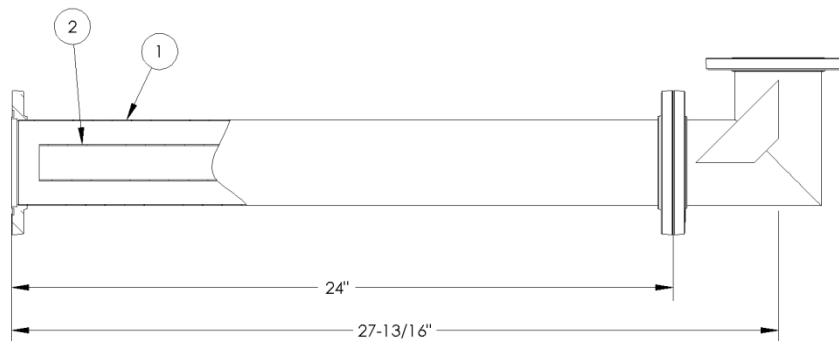
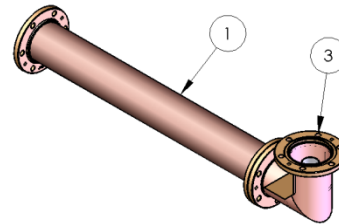
DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR MACH $\pm .5"$ BEND $\pm 1"$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$		QUALITY CONTROL Op INT. Date Comments		PRODUCTION CONTROL Job Number: Date: Priority: Run Size: Issued By: Made By: Qty: Date: Made By: Qty: Date:		DRAWN BY: MLH DATE: 07 MAY 2019 LAST REVISED: INVENTORY: <input checked="" type="radio"/> IN INVENTORY <input type="radio"/> WEIGHT: 173.211 lbs. LENGTH IN FEET: FT MATERIAL: NPN SEE BILL OF MATERIALS		JAMPRO ANTENNAS JSL-2/13-SEO-V ASSEMBLY COMMENTS: SEED FROM 19535-A-010 SEE DWG. NO. 19545-A-010 REV. A SHEET 3 OF 3	
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	19545-A-016	3-1/8" FLANGED LINE WELD	1
2	19545-A-122	3-1/8" FLANGED LINE INNER	1
3	073-31804-00	3-1/8" FLANGED ELBOW ASSEMBLY	1



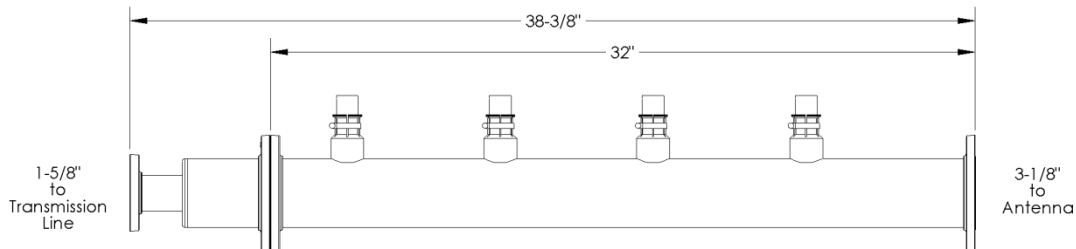
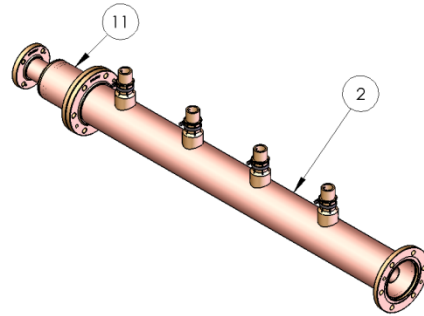
DO NOT SCALE DRAWING		QUALITY CONTROL		PRODUCTION CONTROL		NAME	DATE	JAMPRO ANTENNAS	
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR MACH $\pm .5"$ BEND $\pm 1"$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$		Op	INT.	Date	Comments	Job Number:		DRAWN BY	MLH 07 MAY 2019
		1st				Date:		LAST REVISED	SML D6 Sept 2019
		2nd				Issued By:		INVENTORY	<input checked="" type="radio"/> IN INVENTORY <input type="radio"/>
		3rd				Made By:	Qty:	WEIGHT:	13.866 lbs.
		4th				Made By:	Qty:	LENGTH	FT
		5th				Made By:	Qty:	IN FEET:	
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF JAMPRO ANTENNAS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF JAMPRO ANTENNAS IS PROHIBITED.						MATERIAL		SEE DWG. NO.	
						NPN		A	
						SEE BILL OF MATERIALS		19545-A-015	
								SHEET 1 OF 1	
								REV. B	



6340 Sky Creek Drive, Sacramento, California 95828
P.O. Box 292880, Sacramento, California 95829-2880

(916) 383-1177 FAX (916) 383-1182

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	19545-A-021	3-1/8" FINE MATCH OUTER WELD	1
2	19545-A-124	3-1/8" FINE MATCH INNER	1
3	064-01721-00	UHF FINE MATCHER PROBE	4
4	090-00255-00	UHF FINE MATCHER PROBE TEFLON BUTTON	4
5	774-00214-00	O-RING SILICONE #568-214	4
6	603-00003-00	CONTACT SPRING #97-135	4
7	526-00012-0X	HOSE CLAMP, SS HSS-12	4
8	073-31815-10	3-1/8" TO 1-5/8" STEP REDUCER ASSY	1



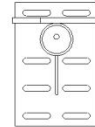
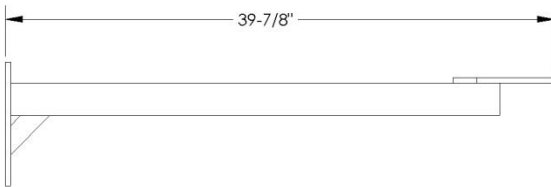
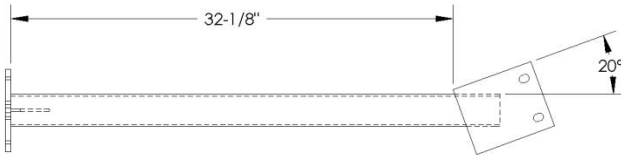
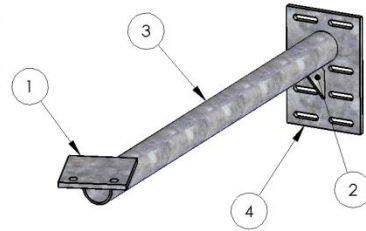
DO NOT SCALE DRAWING		QUALITY CONTROL		PRODUCTION CONTROL		NAME	DATE	JAMPRO ANTENNAS	
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR MATCH $\pm .5"$ BEND $\pm 1"$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$		Op	INT.	Date	Comments	Job Number:		DRAWN BY	MLH 07 MAY 2019
		1st				Date:		LAST REVISED	SML D6 Sept 2019
		2nd				Issued By:		INVENTORY	<input checked="" type="radio"/> IN INVENTORY
		3rd				Made By:		WEIGHT:	17.88682772 lbs.
		4th				Made By:		LENGTH	FT
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF JAMPRO ANTENNAS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF JAMPRO ANTENNAS IS PROHIBITED.		5th				Made By:		SEE BILL OF MATERIALS	
								COMMENTS: SEED FROM 19535-A-025	
								SEE DWG. NO.	A 19545-A-020
								REV.	B



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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	086-00215-00	Plate, Slot Mount	1
2	086-00216-00	Gusset, Slot Brkt	1
3	19545-A-125	Slot Antenna Bracket Arm	1
4	086-00231-00	Plate, Brkt, Std FM	1



U-BOLT SIZE
MAXIMUM: 4"
MINIMUM: 1"

DO NOT SCALE DRAWING		QUALITY CONTROL		PRODUCTION CONTROL		NAME	DATE	JAMPRO ANTENNAS	
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR MACH $\pm .5"$ BEND $\pm 1"$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$		Op	INT.	Date	Comments	Job Number:		DRAWN BY	MLH 07 MAY 2019
		1st				Date:		LAST REVIEWED	
		2nd				Issued By:	Priority:	INVENTORY	<input checked="" type="radio"/> INVENTORY <input type="radio"/>
		3rd				Made By:	Qty:	TESTED	Hot Dip Galvanize
		4th				Made By:	Qty:	WEIGHTS	19.032 lbs.
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF JAMPRO ANTENNAS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF JAMPRO ANTENNAS IS PROHIBITED.		5th				Made By:	Qty:	SURFACE AREA	694.830 IN ²
								MATERIAL	NPN
		SEE BILL OF MATERIALS		A		19545-A-025		SHEET 2 OF 2	

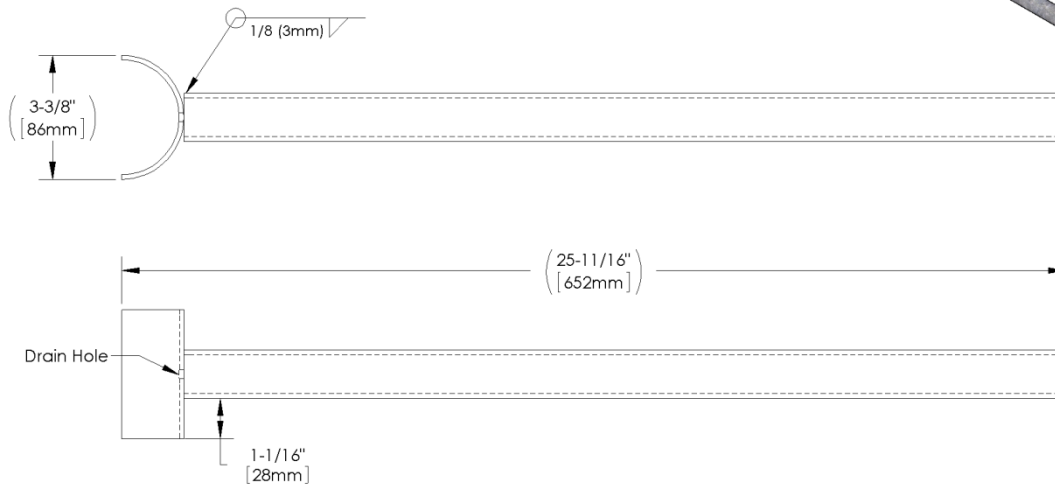
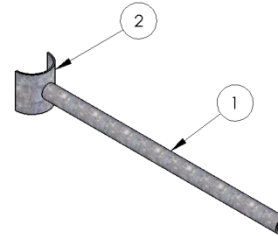


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(916) 383-1177 FAX (916) 383-1182

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	086-00041-00	1" Steel Pipe, 24"	1
2	086-90097-00	3-1/8" LINE SADDLE	1

All steel materials are designed with a minimum yield strength of 36 ksi (250 MPa), u.n.o.



DO NOT SCALE DRAWING		QUALITY CONTROL				PRODUCTION CONTROL				NAME		DATE	JAMPRO ANTENNAS	
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR MATCH $\pm .5"$ BEND $\pm 1"$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .01"$ THREE PLACE DECIMAL $\pm .005"$		Op	INT.	Date	Comments	Job Number:				DRAWN BY	SM	14Nov2005	Adjustable Saddle Bracket	
		1st				Date:	Priority:			LAST REVISED	MLH	22 SEP 2006	3-1/8" x 24"	
		2nd				Issued By:	Run Size:			REVISION	O	INVENTORY	<input checked="" type="radio"/>	
		3rd				Made By:	Qty:	Date:					Hot Dip Galvanize	
		4th				Made By:	Qty:	Date:					3.968 lbs.	
		5th				Made By:	Qty:	Date:						
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF JAMPRO ANTENNAS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF JAMPRO ANTENNAS IS PROHIBITED.						LENGTH IN FEET:		FT	COMMENTS:					
						MATERIAL:		NPN						
						SEE BILL OF MATERIALS								
						SIZE (DWG. NO.)		A 077-00024-00		REV. B				
						SHEET 1 OF 1								

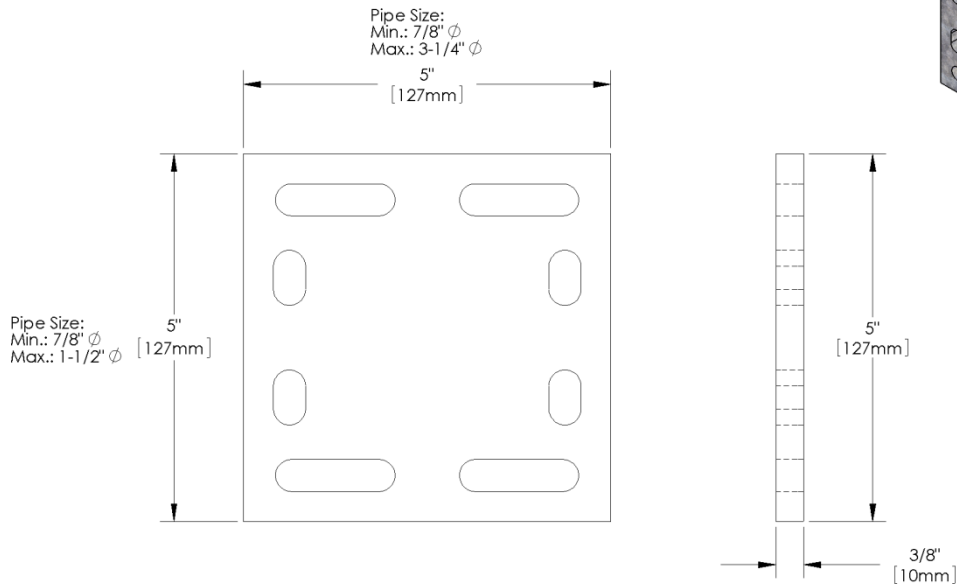


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(916) 383-1177 FAX (916) 383-1182

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	086-00070-00	Standard Cross Plate	1

Minimum yield strength = 36 ksi (250 MPa), u.n.o.



DO NOT SCALE DRAWING				QUALITY CONTROL				PRODUCTION CONTROL				NAME _____ DATE _____		JAMPRO ANTENNAS Standard Cross Plate, Adjustable Brackets	
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES: FRACTIONAL $\pm 1/32"$ ANGULAR: MACH $\pm 5"$ BEND $\pm 1"$ ONE PLACE DECIMAL $\pm .025"$ TWO PLACE DECIMAL $\pm .015"$ THREE PLACE DECIMAL $\pm .005"$				Op.	INT.	Date	Comments	Job Number:	Priority:	Run Size:	DRAWN BY _____	DATE _____			
				1st				Date:			LAST REVISED _____	SM	08Apr2008		
				2nd				Issued By:			INVENTORY <input type="radio"/> NON-INVENTORY <input checked="" type="radio"/>				
				3rd				Made By:	Qty:	Date:	Hot Dip Galvanize				
				4th				Made By:	Qty:	Date:	WEIGHT _____				
				5th				Made By:	Qty:	Date:	LENGTH _____				
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF JAMPRO ANTENNAS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF JAMPRO ANTENNAS IS PROHIBITED.								MATERIAL: _____				COMMENTS _____			
								NPN				SEE (DWG. NO.) _____			
								SEE BILL OF MATERIALS				A 077-00029-00		REV. _____	
												SHEET 1 OF 1			



WARRANTY

Jampro Antennas, Inc. LIMITED WARRANTY AND LIMITATION ON DAMAGES

All implied warranties have been excluded – see section 5

There are conditions precedent to any warranty obligations – See sections 6 and 7

There are limitations on damages – See section 8

Definition of Jampro represents the combined business efforts of Jampro Antennas, Inc. and Jampro RF Systems, Inc., each a separate business entity.

1. LIMITED WARRANTY

- 1.1 Jampro warrants to all original purchasers of Jampro products that all new parts, products, and equipment manufactured and sold by Jampro shall be free from defects in material and workmanship for twenty-four (24) months from date of shipment. If any part, product, or equipment becomes defective, malfunctions, or fails to conform to this written Limited Warranty under normal use and service, and if the original purchase complies with Sections 5 and 6 of this Limited Warranty, then Jampro will, without charge, at its option, either repair, or replace the defective or non-conforming part, product, or equipment subject to the provisions of Sections 3 and 4 of this Limited Warranty.
- 1.2 FCC Directional Antenna and Pattern Optimization: Jampro Antennas, Inc. warrants to those customers who have purchased FCC directional antennas or pattern optimization service that the radiation pattern requested by the customer will be reproducible under controlled conditions at the Jampro Antennas, Inc. test site in Sacramento, California. It is the sole responsibility of the customer to determine, evaluate, and compensate for any terrain, structural, climate controls, or other conditions or effects which may cause the radiation pattern at the customer's actual broadcast site to vary from controlled conditions at the Jampro Antennas, Inc. test site in Sacramento, California. No warranty is made regarding the radiation pattern at the customer's actual broadcast site.

2. PRODUCTS COVERED BY THIS WARRANTY



WARRANTY

This Limited Warranty shall extend to all parts, products, and equipment manufactured and sold by Jampro Antennas, Inc. but shall not extend to equipment supplied from other manufacturers, which shall be warranted only for the period, purposes, and conditions extended by such manufacturers to Jampro Antennas, Inc. Services provided by Jampro Antennas, Inc. and related warranties only extend to those customers who have purchased and paid for such services separate and apart from the purchase of any antenna or RF system.

3. AUTOMATIC TERMINATION OF WARRANTY OBLIGATIONS

Any obligation of Jampro Antennas, Inc., under this Limited Warranty will automatically and immediately terminate, without notice from any further action by Jampro Antennas, Inc. and Jampro Antennas, Inc. shall have no responsibility for damages of any kind, as a result of the occurrence of any of the following:

- A. Warranties are null and void if customers account is not current.
- B. Accident, misuse, or negligent use of any equipment.
- C. Repairs or alterations made to any part, product, or equipment outside Jampro's factory except by an employee of Jampro Antennas, Inc.
- D. Improper installation or operation (including both mechanical and electrical) or any equipment.
- E. Failure to provide normal maintenance for any parts, products, or equipment.
- F. Use of more transmitter power than specified in the rating for the equipment sold by Jampro Antennas, Inc.
- G. Failure to wire or use any safety interlocking device.

4. EXCLUSIONS

This Limited Warranty shall not extend to, nor shall Jampro Antennas, Inc. be responsible for damages of any kind resulting from:

- A. Signal coverage, penetration of signal, multipath effects, reduction or distortion in FM stereo operation, and signal coverage or ghosting in TV antenna systems. The sole obligation of Jampro Antennas, Inc. is to provide the part, product, or equipment specified by the customer. If the customer has ordered FCC directional antenna or pattern optimization service, then the extent of the obligation of Jampro Antennas, Inc.



WARRANTY

is limited as set forth in sections 1.2 and 2 of this Limited Warranty and in the "FCC DIRECTIONAL ANTENNA AND PATTERN OPTIMIZATION SERVICE DISCLAIMER". In no event shall Jampro Antennas, Inc. be liable to the customer for damages of any kind nor shall Jampro Antennas, Inc. be obligated to alter, adjust, or correct the radiation pattern at the customers actual broadcast site, provided the radiation pattern requested was achieved under controlled conditions at Jampro's test range in Sacramento, California.

- B. Failure of transmitter reflectometer trip-out circuitry to protect the antenna system or other parts, products, or equipment sold Jampro Antennas, Inc. when the VSWR exceeds 1.2:1.
- C. Lightning, weather conditions or acts of God.

5. IMPLIED WARRANTIES EXCLUDED

All implied warranties of merchantability and fitness for any particular purpose are excluded. The sole warranty obligation of Jampro Antennas, Inc. is the Limited Warranty set forth in Section 1 above. Under no circumstance will Jampro Antennas, Inc. have any liability to any customer (A) as a result of the customer relying, or claiming to have relied on the skill or judgment of Jampro Antennas, Inc. to select or furnish suitable parts, products, or equipment, or (B) in the event Jampro Antennas, Inc. knows, or has reason to know, any specific needs or requirements of the customer or regarding any matters concerning the customers broadcast site or the customers intended use or application of the parts, products, or equipment.

6. CONDITION PRECEDENT TO ENFORCEMENT OF THIS LIMITED WARRANTY

As a condition precedent to enforcement of this Limited Warranty, the original purchaser must within ten days from the date of receipt of the part, product, or equipment, execute and return to Jampro Antennas, Inc. by registered mail the Limited Warranty Registration Card attached to the part, product, or equipment, or included in the Instruction Book.

7. ENFORCEMENT OF LIMITED WARRANTY

Any defective Jampro Antennas, Inc. part, product, or equipment to be repaired or replaced pursuant to Section 1 of this Limited Warranty shall be returned with transportation charges prepaid to Jampro Antennas, Inc. 6340 Sky Creek Drive,



WARRANTY

Sacramento, California 95828 USA. All return shipments shall be made Cash on Delivery (COD) to the customer.

8. LIMITATION ON DAMAGES (CONSEQUENTIAL DAMAGES EXCLUDED)

Jampro Antennas, Inc. shall not be responsible or liable for, nor does this Limited Warranty extend to any consequential or incidental damages or expenses of any kind or nature, and regardless of the cause thereof or any knowledge which Jampro Antennas, Inc. may have regarding the probability of the occurrence of such damages or expenses, including without limitation, injury to persons or property, loss of use of the product, riggers costs (including without limitation standby fees, move-on and move-off charges, and seasonal or overtime differentials), costs of installation of any tower or related equipment, loss of broadcast revenue, loss of station license or loss of goodwill. In addition, Jampro Antennas, Inc. shall not be liable to the customer for any cost or expenses incurred in removing or reinstalling the antenna, or for engineers, consultants, or other parties hired or engaged by the customer to evaluate, test or analyze the products supplied by Jampro Antennas, Inc. or their performance.

Jampro Antennas, Inc. shall not be liable for incidental exemplary, special, or consequential damages in any action based on tortuous acts or omissions by Jampro Antennas, Inc. in any way related to this agreement.

Jampro Antennas, Inc. and customer acknowledge that such lack of liability, without limiting the generality of the foregoing, includes lack of liability for any loss of actual or anticipated revenue or profits, loss of air time, loss of actual or anticipated value of the business of both parties and damages to the business reputation of either party to this agreement.

9. NO OTHER WARRANTIES MADE

This Limited Warranty is in lieu of all other expressed or implied warranties of Jampro Antennas, Inc. and Jampro does not assume, nor does it authorize any person to assume on its behalf, any other obligation or liability, either verbally or in writing.

10. OTHER RIGHTS

This Limited Warranty gives you specific legal rights. You may also have other rights, which may vary from state to state or country to country.



WARRANTY

By affixing their signature below, customer warrants that he or she has read and understood this agreement and agrees that Jampro Antennas, Inc. will not be liable to Customer for the failure of the FCC directional antenna and pattern optimization service to achieve the radiation pattern desired at the Customer's broadcast site. Customer further understands that this document is intended to limit Jampro Antennas, Inc.'s obligations and liability to customer and to delineate the mutual obligations and expectations of customer and Jampro Antennas, Inc.

Date: _____

Customer Name: _____

Company _____

Title _____