

MACXLine® 4-1/16" 50 ohm

Rigid Coaxial Transmission Line

Type MACX450

NOTICE

The installation, maintenance, or removal of antenna and transmission line systems requires qualified, experienced personnel. ERI installation instructions have been written for such personnel. Antenna systems should be inspected once a year by qualified personnel to verify proper installation, maintenance, and condition of equipment.

ERI disclaims any liability or responsibility for the results of improper or unsafe installation practices.

Description

ERI MACX450 Rigid Coaxial Transmission Line is used to provide an outdoor, high-power signal path between TV and FM transmitters and the broadcast antennas. The antenna end of each MACXLine section inner conductor is provided with a bellows to compensate for thermal expansion and to prevent wear and the eventual failure of the section to section connection.

MACXLine Transmission Line Systems contain components and accessories with the following Type Numbers. Those marked with an asterisk * are supplied with their own installation instructions. All Installation Instructions need to be read before commencing any installation.

MACX450-1,-2,-3, or -11	standard length sections 240", 237", 234" and 210"
MACX450-5, -10, -20	non-standard sections 6"-60", 61"-120" and 121"-240"
* MACX450-39	field trim section 61"-240"
* MACX450-41	field trim sections 6"-60"
* ACX450-10SE	equal leg elbow
* RLA400-11	vertical spring hanger
* RLA400-12	horizontal spring hanger
* RLA400-13	rigid hanger
* RLA400-14	lateral brace
* RLA400-15	wall/roof feed-thru
* RLA475-16	gas barrier
* RLA400-17	rigid horizontal hanger
* STD450-FT	fine tuner

Non-standard section lengths may be pre-ordered or have their lengths called in from the field.

MACXLine components comprise: outer conductor with flanges; inner conductor with bellows†, captivated bullet, support and flange insulators; flange hardware; silicone grease and O-ring to seal the flange.

MACXLine installation requires at least three people and can begin at the antenna (top-down installation) or at the transmitter (bottom-up installation).

Note: The transmission lines must be installed with the bullet-bellows end towards the antenna regardless of the installation method.

Flange Data

Flange Diameter	6-3/16"
Number of Bolts	8
Bolt Size	3/8"-16UNC
Bolt Torque	21 lbf-ft.

Tools Required

- 9/16" Combination Wrenches, for flange hardware.
- Leak detector liquid.

Additional tools required for field trimming MACX450 39 and MACX450-41

- Propane/oxygen torch
- Cleaning Brush
- Hacksaw
- Utility Knife
- Tape Measure
- Miter Box
- Torque Wrench, 65 lbf-in to 21 lbf-ft, 3/8" square drive*
- Strap Wrench for 1-1/2" to 2" diameter pipes*
- 5/32" Hex Key, 3/8" square drive*
- 5/16" Hex Key, 3/8" square drive*

*These tools are available in ERI Tool Kit, Type MACX TK.

Note: Illustrations are typical. Supplied components may vary in detail.

Direction of Installation

MACXLine installation requires at least three people and can begin at the antenna (top-down installation) or at the transmitter (bottom-up installation). Top-down installation requires at least one RLA400-13 Rigid Hanger at the top of the vertical run. (Refer to the RLA400-13 Installation Instructions for details.)

Bottom-up installation must use one or more rigid hangers at the bottom of the vertical run to provide temporary support for the transmission line.

CAUTION

1. Do not support more than one section of vertical line on a flange joint without attaching the spring hangers.
2. Ensure all horizontal runs of transmission line are protected from falling ice and debris to prevent possible damage.
3. Rigid hangers used at the bottom of the vertical run must be removed immediately after installing top rigid hangers to prevent serious damage to the antenna and/or transmission line.
4. Do not install a field cut section at the top of the vertical run of a bottom-up installation until the bottom elbow has been correctly located. (See elbow location section in next column.)

Installation

1. Remove protective cover from line section flange.
2. Apply thin coating of silicone grease to O-ring and secure in flange groove. Use care to insure O-ring and flange groove are free of dirt before installing O-ring in groove.
3. Remove excess silicone grease from flange contact surface to insure good electrical contact and pressure seal. Align inner connector bullet with inner conductor from previously installed section, combiner or antenna. Mate bullet with inner conductor and keep aligned, Figure 3.
4. Align flange pin with corresponding flange alignment hole and mate flanges. Verify flange insulator is properly seated in appropriate flange groove. Firmly push flanges together while checking that O-ring remains in correct position.
5. Install all flange hardware and alternately snug hardware at 180 degree locations, Figure 4, while maintaining a uniform gap between flanges. Perform final tightening sequence in a similar pattern as above to a torque value of 21 lb-ft. When properly installed, a small uniform gap should be visible around flange circumference.

Note: Use anti-seize compound on all stainless steel hardware to prevent galling. If hardware becomes galled during tightening procedure, remove damaged hardware and install replacement hardware to insure proper electrical contact between flange surfaces.

Elbow Location and Field Cut or Call-in Sections

The position of the elbow joining the horizontal and vertical runs must be set to take account of the ambient temperature at the time of installation. Its position compared with respect to the center lines of the horizontal and vertical runs is determined from the tables below.

MACX450-39 and -41 Field Cut Sections or MACX450-5, -10 or -20 Call-in sections in the vertical and horizontal runs must be trimmed to ensure this position is achieved.

Measure the length required to set the elbow to the vertical and horizontal center lines then add the length (or subtract for negative values) the amount given in Table 1 for vertical sections or Table 2 for horizontal sections. Use the ambient temperature at the time of measurement.

Pressurization

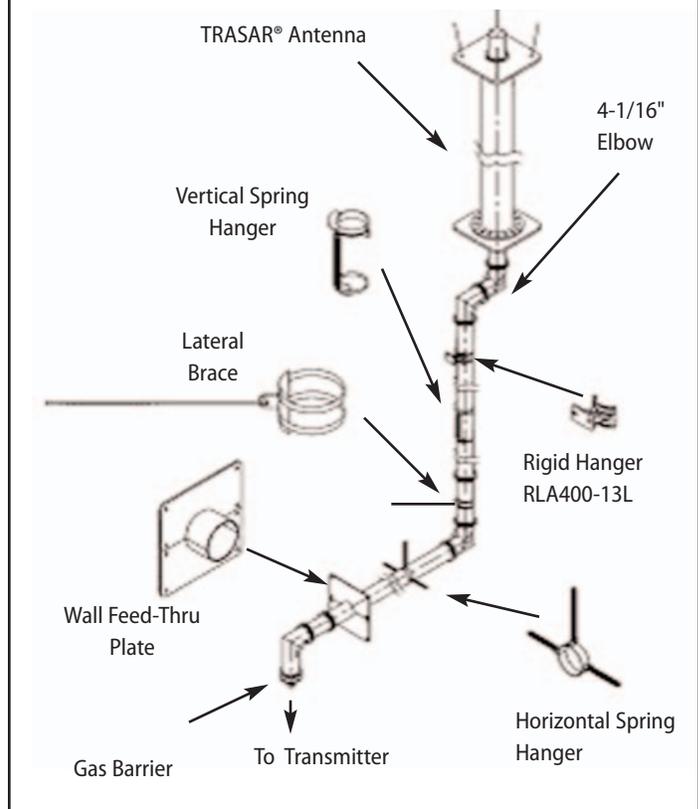
Maximum pressurization values are determined by lowest rated system component and should not be exceeded (typically 3-5 psi).

The transmission line is rated at 10 lbs/in² maximum. Consult applicable pressurization specifications on other system components (usually much lower) to determine maximum system pressurization limit (generally 3 psi with antenna, 1/2 psi with rectangular wave guide).

After installation is complete pressurize line and check flange connections for leaks. Use commercial leak detector or liquid detergent over joints and check for evidence of bubbles. Unbroken soap film over entire joint for several minutes indicates absence of noticeable leaks.

Transmission line must be pressurized at all times to prevent changes in ambient temperature from causing condensation to occur inside transmission line. This condensation can seriously impair transmission line performance. If moist air enters the system, it must be purged by removing gas port plug located on gas barrier or near antenna input flange.

Figure 1

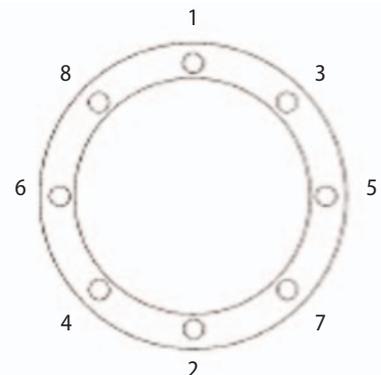


Alternative method is to pressurize line and then let air escape at transmitter end of line. Repeat procedure several times allowing one hour each time for air to mix. After purging, replace gas port plug and pressurize line.

Line assemblies are not hermetically sealed and may exhibit low leakage rate. Line installations not using automatic gas supply must be periodically inspected. Dry air or nitrogen is normally used for pressurizing. Teflon tape is to be used on all gas ports or wherever pipe fittings are used on transmission line.

Figure 2

Tighten bolts uniformly to prevent flange distortion



Elbow *below* Horizontal Run Center Line, ins (mm)

Line Height ft (m)	Ambient Temperature, °F (°C)				
	0 to 20 (- 18 to -7)	20 to 40 (-7 to 4)	40 to 60 (4 to 16)	60 to 80 (16 to 27)	80 to 100 (27 to 38)
0-200 (0-61)	- 1/8 (- 2)	0 (- 2)	0	0 (2)	1/8 (2)
200-400 (61-122)	- 3/8 (- 9)	- 1/8 (- 5)	0	1/8 (5)	3/8 (9)
400-600 (122-183)	- 5/8 (- 15)	- 1/4 (- 8)	0	1/4 (8)	5/8 (15)
600-800 (183-244)	- 7/8 (- 22)	- 3/8 (- 11)	0	3/8 (11)	7/8 (22)
800-1000 (244-305)	- 1-1/8 (- 28)	- 1/2 (- 14)	0	1/2 (14)	1-1/8 (28)
1000-1200 (305-366)	- 1-3/8 (- 34)	- 5/8 (- 17)	0	5/8 (17)	1-3/8 (34)
1200-1400 (366-427)	- 1-5/8 (- 40)	- 3/4 (- 20)	0	3/4 (20)	1-5/8 (40)
1400-1600 (427-488)	- 1-7/8 (- 46)	- 7/8 (- 23)	0	7/8 (23)	1-7/8 (46)
1600-1800 (488-549)	- 2-1/8 (- 52)	- 1 (- 26)	0	1 (26)	2-1/8 (52)
1800-2000 (549-610)	- 2-1/4 (- 59)	- 1-1/8 (- 29)	0	1-1/8 (29)	2-1/4 (59)

Table 1

Elbow *beyond* Vertical Run Center Line, in (mm)

Line Height ft (m)	Ambient Temperature, °F (°C)				
	0 to 20 (- 18 to -7)	20 to 40 (-7 to 4)	40 to 60 (4 to 16)	60 to 80 (16 to 27)	80 to 100 (27 to 38)
0-200 (0-61)	0	0	0	0	0
200-400 (61-122)	- 1/8 (- 3)	- 1/8 (- 2)	0	1/8 (2)	1/8 (3)
400-600 (122-183)	- 1/4 (- 6)	- 1/8 (- 3)	0	8-Jan (3)	1/4 (6)
600-800 (183-244)	- 1/4 (- 8)	- 1/8 (- 4)	0	1/8 (4)	1/4 (8)
800-1000 (244-305)	- 3/8 (- 10)	- 1/4 (- 5)	0	1/4 (5)	1/8 (10)
1000-1200 (305-366)	- 1/2 (- 12)	- 1/4 (- 6)	0	1/4 (6)	1/2 (12)
1200-1400 (366-427)	- 5/8 (- 15)	- 1/4 (- 7)	0	1/4 (7)	5/8 (15)
1400-1600 (427-488)	- 5/8 (- 17)	- 3/8 (- 8)	0	3/8 (8)	5/8 (17)
1600-1800 (488-549)	- 3/4 (- 19)	- 3/8 (- 10)	0	3/8 (10)	3/4 (19)
1800-2000 (549-610)	- 7/8 (- 21)	- 3/8 (- 11)	0	3/8 (11)	7/8 (21)

Table 2

Figure 3

