Installation Instructions

100A Series Low Power FM Antenna

Type's: 100A-1M, 100A-2F, 100A-2F-HW, 100A-4F-HW

Notice
The installation, maintenance, or removal of antenna systems requires qualified, experienced personnel. ERI installation instructions are 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 installation practices.

READ THE INSTRUCTIONS THOROUGHLY BEFORE ASSEMBLY

Preparation
Before beginning the assembly and installation of the 100A Series antenna system, make sure all parts are present.

Tools Required (not included)

• 5/32 Inch Allen wrench
• 9/16 Inch Open-end wrench
• Adjustable wrench (15/16 Inch Capacity)
• Ruler or Tape Measure accurate to 1/32 inch (.03 in)

NOTE: A torque wrench adaptable to tools mentioned above will be helpful in the installation process.

Parts*
1. Element Boom Assembly (qty 1)
2. Element Arm Assembly (qty 2)
3. Arm Extender Kit (qty 4)
4. Universal Mounting Clamps (qty 2)
5. Cable Ties (qty 10)

* The parts listed are for the AR-100A-1M.

Please Read the Following before Installing Your Antenna

If your antenna is/was ordered as a "special" or "directional" antenna it may come with additional customized parts and factory tuning. If so, a set of customized drawings are provided for the installation and supersede these and all other instructions. No additional tuning will be required unless you are willing to attempt an on-site, as-mounted trial and error tuning process (see below, Improving the Match of Your Standard 100 Series Antenna)

Standard 100 Series Information

The 100 Series antenna provides a knock-down kit of components that can be quickly assembled into a basic FM circular polarized broadcast antenna. The element feed consists of a 1/2" pigtail coax terminated in a male 7-16 DIN connector. This cable is rated to handle 1kW. The rating becomes 2kW when the elements are assembled into an array of two or more bays using power dividers. The antenna’s optimal operating frequency is established by setting the dipole arm extenders, feed strap position and spacing of elements. The information for setting these variables is charted in the appropriate settings table. When properly adjusted the antenna should provide an acceptably low VSWR, however, please note:

During development the "standard" 100 Series antenna, in all its currently offered configurations, was carefully assembled and adjusted on ERI’s test tuning tower to deliver a VSWR match of 1.15:1 or lower when at each chart. It is possible that your match could be sub-optimized due to your specific surroundings and mounting configuration. Nevertheless, your VSWR should never exceed a 1.5:1.

Half-Wave 100 Series Applications

The half-wave spacing of elements provides a practical solution to the problem of downward radiation. Due to the interactions between flipped elements when arranged as half-wave spaced 2-bay or 4-bay arrays, the match is flatter over a wider range of frequencies (typically 6 MHz) than full wave spaced antennas. Therefore the settings table for half-wave antennas is much reduced and only four setting points are charted.

Improving the Match of Your 100 Series Antenna

The antenna was designed to have an optimized match and bandwidth on a small triangular tower or pole. If you desire that the antenna be tuned in its actual environment due to an unacceptable mismatch, follow these steps to attempt to reduce reflected energy.

1.) Reposition the element’s feed strap to either one position above and/or below the starting position. Use the best of the three positions and move on to step 2.

2.) Readjust the dipole’s arm tip length in 1/4" increments to reach minimal VSWR. Realize that the longer the dipole arm is, the more likely it will shift a null (as indicated on an analyzer sweep) to a lower frequency.

Use the below area to record your purchase for future reference.

100 Series Model Number:
Operating Frequency: 
When purchased:
Agents Phone Number:
Antenna Match:

Step 1: Secure the Feed Grounding Ring to the Element Arm

1. To ensure a good electrical connection between the Grounding Ring and the Element Arm, temporarily remove the 5/16" wing-nut, lock-washer and flat-washer from the grounding set-screw.

2. Next, locate your frequency range and antenna type number and find the corresponding grounding ring position on assembly drawing chart.

3. Now slide the Grounding Ring over the spot that corresponds to the correct grounding ring position.

4. Using a 5/32" Allen wrench, tighten the set screw to 11 lbf-ft (15 N-m) torque imbedding the screw into the Element Arm.

5. Repeat Step 1 for the remaining Element Arm assemblies.

Step 2: Install Arm Extenders

1. Loosen the 15/16" End Fastener (brass nut found at each end of both element arms) to the point where the Arm Extender can be freely inserted. NOTE: As shipped, the element arm's 5/16" end fasteners are pre-tightened in order to trap the assembly's internal compression ring. Caution should be exercised while performing this operation. Removing the nut could result in the loss of the internal compression ring.

2. Insert an Arm Extender into each end of the Element Arm.

3. Locate your frequency range & antenna type number in the Tip Length table & find the corresponding Tip Length "L". NOTE: Be certain that you are using the length that corresponds both to your antenna frequency & type number.

4. Position each Arm Extender so that the exposed length is "L" (from the table). This length is measured from the top of the 5/16" clamping nut to the tip of arm extender. NOTE: The extender tip length is critical and must be set correctly.

5. Once the Arm Extender is set, secure the connection with an adjustable wrench & torque to 15 lbf-ft (21 N-m).

Step 3: Mount the Element Arms to the Element Boom

1. Remove the mounting hardware (stainless steel 3/8 flat-washer, lock-washer & nut) from both Boom Cradle Brackets (Step 3a & 3b).

2. Place one Element Arm into each Boom Cradle Bracket with the Grounding Ring Stud pointing up.

3. Secure the arm to the Cradle Bracket using the mounting hardware (stainless steel 3/8 flat-washer, lock-washer and nut).

4. Tighten the cradle nut until the cradle's sharp grounding point is firmly seated into the Element Arm material and the lock washer is compressed, approximately 12 lbf-ft (16 N-m) torque.

Step 3a

Step 4: Attach the Feed Strap

1. Loosen the feed insulator wing-nut and swing the strap from the shipped position (perpendicular to the Boom) to where the strap engages the Grounding Ring's protruding threaded studs (set-screws).

2. Fasten the strap to the two threaded studs; a proper connection is obtained when the strap is sandwiched between the two stainless-steel flat washers, lock washer and 5/16 inch wing-nut removed in Step 1. The Grounding Ring Wing-Nut is secured using 8 lbf-ft (11 N-m) of torque applied to the wing-nut.

3. Hand tighten the insulator wing nut taking care not to exceed the 3 lbf-ft (4 N-m) torque rating.

Step 5: Secure the Antenna to its support structure

A Universal Mounting Clamp Kit is included with the antenna for ease of mounting to the tower leg. The Brackets supplied mount to legs ranging from Ø1.25 thru Ø5.00. The kit generally eliminates the need for any additional brackets, however chain and "J" bolts can be ordered for larger pole installations.

For Technical Support call 877 ERI-LINE or 1 (812) 925-6000, or visit our website at www.erin.com
**ATTENTION**

- **ANTENNA INPUT** = 7/16 DIN MALE GAS BLOCK CONNECTOR, MATING LINE MUST HAVE 7/16 DIN FEMALE CONNECTOR.
- **ANTENNA INPUT CONNECTOR** is attached to 1/2" from cable. This antenna feed cable, (PGT-tail) extends approx. 7.5 ft. past boom. This PGT-tail must be secured using cable ties (item #6).
- **BRACKETS SUPPLIED TO LEGS RANGING FROM 0.25 MIN. TO 0.50 MAX.**

**DETAIL A**  
**GROUNDING RING POSITION & TIP LENGTH**

**.RIGHT VIEW**

**MINIMUM RADIUS**

**TIP LENGTH** - inch  
**TIP LENGTH** - cm  
**GROUNDING RING POSITION**

<table>
<thead>
<tr>
<th>FREQUENCY RANGE</th>
<th>TIP LENGTH (inch)</th>
<th>TIP LENGTH (cm)</th>
<th>GROUNDING RING POSITION</th>
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</thead>
<tbody>
<tr>
<td>107.5 - 108.0</td>
<td>2.31</td>
<td>5.87</td>
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<tr>
<td>106.5 - 107.4</td>
<td>2.75</td>
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<td>105.5 - 106.4</td>
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<td>104.5 - 105.4</td>
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<td>103.5 - 104.4</td>
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<td>102.5 - 103.4</td>
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<td>101.5 - 102.4</td>
<td>4.38</td>
<td>11.11</td>
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<tr>
<td>100.5 - 101.4</td>
<td>4.63</td>
<td>11.75</td>
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<td>99.5 - 100.4</td>
<td>5.00</td>
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<td>98.5 - 99.4</td>
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<td>97.5 - 98.4</td>
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<td>14.29</td>
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<td>96.5 - 97.4</td>
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<td>15.4</td>
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<td>95.5 - 96.4</td>
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<td>15.22</td>
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<td>94.5 - 95.4</td>
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<td>16.07</td>
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<td>93.5 - 94.4</td>
<td>7.13</td>
<td>18.1</td>
<td>3</td>
</tr>
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<td>92.5 - 93.4</td>
<td>7.31</td>
<td>18.57</td>
<td>3</td>
</tr>
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<td>91.5 - 92.4</td>
<td>7.50</td>
<td>19.05</td>
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</tr>
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<td>90.5 - 91.4</td>
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<td>20</td>
<td>4</td>
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<td>89.5 - 90.4</td>
<td>8.11</td>
<td>21.11</td>
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<td>88.5 - 89.4</td>
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<td>22.23</td>
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<td>87.5 - 88.4</td>
<td>9.19</td>
<td>23.34</td>
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</table>

- **QUALITY**
- **ASSIGNMENT**
- **PRODUCT**
- **BILL OF MATERIAL**
- **PRODUCER**
- **MANUFACTURER**
- **DETAIL A**
- **GROUNDING RING POSITION & TIP LENGTH**

**Refer to Detail "A"**

**ANTENNA INPUT** = 7/16 DIN CONNECTOR - MALE  
(MATING LINE MUST HAVE A 7/16 DIN FEMALE CONNECTOR)

**TOP VIEW**

**GROUNDING RING POSITION & TIP LENGTH**

**GROUNDING RING POSITION (SEE CHART)**

**TIP LENGTH (SEE CHART)**

**3.0" MINIMUM BEND RADIUS**

**100A SERIES ANTENNA**

**100A-1M CHART**

- **FREQUENCY RANGE**
- **TIP LENGTH - inch**
- **TIP LENGTH - cm**
- **GROUNDING RING POSITION**

**BILL OF MATERIAL**

**PROJECT NO.**

**ERI APPROVAL NAME**

**DATE**

**DRAWN BY**

**CUR**

**DATE**

**DRAFTING**

**STYLE**

**DATE**

**PRINT**

**DATE**

**EXT. APPROVAL**

**DATE**

**BILL NO.**

**DESCRIPTION**

**AS NOTED**

**SUPERSEDES PART NO.**

**CLR 1/15/2016**

**R. ROSE 7/13/2016**

**REF 7/13/2016**

**REV.**

**100A SERIES ANTENNA**

**1 BAY ASSEMBLY**

**ELECTRONICS RESEARCH INC.**

**ESTABLISHED 1943**

**7777 GARDNER Rd.**

**CHANDLER, IN 47610-9219**

**PHONE: (812) 925-6000**

**FAX: (812) 925-4030**

**UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND APPLICABLE AT 20°C (68°F)**

**TOLERANCES**

- **OVERALL-NOT CUMULATIVE**: ± .03
- **2 PLACE DECIMAL**: ± .03
- **3 PLACE DECIMAL**: ± .010
- **ANGULAR**: ± .5°
- **FRACTIONAL**: ± 1/16"
**SECTION B-B**

**SCALE 1 / 4**

**DETAIL A**

**GROUNDING RING POSITION & TIP LENGTH**

**GROUNDING RING POSITION (SEE CHART)**

**TIP LENGTH** (SEE CHART)

**ARTICLE FEED PIGTAILS ARE APPROX. 7.5 FT. LONG & MUST BE SECURED USING CABLE TIES SUPPLIED WITH ITEM #1.**

**SECTION B-B**

**SCALE 1 / 4**

**DETAIL A**

**GROUNDING RING POSITION & TIP LENGTH**

**GROUNDING RING POSITION (SEE CHART)**

**TIP LENGTH** (SEE CHART)

**ARTICLE FEED PIGTAILS ARE APPROX. 7.5 FT. LONG & MUST BE SECURED USING CABLE TIES SUPPLIED WITH ITEM #1.**
When Bay 2 is installed the Element is to be facing downward as shown. For proper attachment the plate must be moved to the opposite side of Boom as shown.

**Grounding Ring Position & Tip Length**

**Brackets & Hose Clamps for Mounting are Supplied with Power Divider.**

**Bill of Material**

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<tr>
<th>Item</th>
<th>Qty</th>
<th>Part Number</th>
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<td>AE-100A-1M</td>
<td>100A Series Power Divider</td>
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<td>2</td>
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<td>100A Series Antenna</td>
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**Frequency**

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<tr>
<th>Frequency</th>
<th>Item 2 P/N</th>
<th>Tip Length (in)</th>
<th>Tip Length (cm)</th>
<th>Bay Spacing (in)</th>
<th>Bay Spacing (cm)</th>
<th>Grounding Ring Position</th>
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<td>PD100A-4-21</td>
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**Revision History**

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<th>Description</th>
<th>Date</th>
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<tr>
<td>A</td>
<td>Updated per ECR 2016-032</td>
<td>9/26/2016</td>
<td>K. Schard</td>
</tr>
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- 7772 Gardner Rd.
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- 47610-9219
- Phone: (812) 925-6000
- Fax: (812) 925-4030

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**Third Angle Projection**

**Third Angle Projection:**

- Drawings are presented in Third Angle Projection, which is a standard convention used in engineering and design for clarity and consistency.

**Bill of Material:**

- **Component List:**
  - Item 2 P/N: AE-100A-1M
  - Item 1: AE-100A-1
- **Material:**
  - **Finish:**
  - **Supplied:**

**Rev:**

- **Revision:**
  - **Date:**
  - **Approved by:**

**Drawing Scale:**

- **Revision C:**
  - **Scale 1/4**

**Dimensions:**

- **Overall:**
  - **Tolerances:**
    - ± .06
    - ± .1
    - ± .3
    - ± .5°
    - ± 1/16"
BRACKETS SUPPLIED MOUNT TO LEGS RANGING FROM Ø1.25 MIN. TO Ø5.00 MAX.

ELEMENT FEED PIGTAILS ARE APPROX. 7.5 FT. LONG & MUST BE SECURED USING CABLE TIES SUPPLIED WITH ITEM #1.

WHEN BAY 2 & 3 IS INSTALLED THE ELEMENT IS TO BE FACING DOWNWARD AS SHOWN. FOR PROPER ATTACHMENT THE PLATE MUST BE MOVED TO OPPOSITE SIDE OF BOOM AS SHOWN.
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UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND APPLICABLE AT 20°C (68°F)

TOLERANCES:
OVERALL - NOT CUMULATIVE 1 PLACE DECIMAL ± .1
2 PLACE DECIMAL ± .03
3 PLACE DECIMAL ± .010
ANGULAR ± .5°
FRACTIONAL ± 1/16"

THIRD ANGLE PROJECTION

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FREQUENCY: 88.1 - 91.9, 92.1 - 95.9, 96.1 - 101.9

ITEM 3 P/N: PD100A - 4 - 41
ITEM 5 P/N: PD100A - 4 - 41B
TIP LENGTH (in): 8.94
TIP LENGTH (cm): 22.71
BAY SPACING (in): 59.75
BAY SPACING (cm): 151.77
GROUNDING RING POSITION: 3

ITEM 3 P/N: PD100A - 4 - 42
ITEM 5 P/N: PD100A - 4 - 42B
TIP LENGTH (in): 6.50
TIP LENGTH (cm): 16.51
BAY SPACING (in): 59.75
BAY SPACING (cm): 151.77
GROUNDING RING POSITION: 4

ITEM 3 P/N: PD100A - 4 - 43
ITEM 5 P/N: PD100A - 4 - 43B
TIP LENGTH (in): 5.25
TIP LENGTH (cm): 13.34
BAY SPACING (in): 57.63
BAY SPACING (cm): 146.38
GROUNDING RING POSITION: 2

ITEM 3 P/N: PD100A - 4 - 44
ITEM 5 P/N: PD100A - 4 - 44B
TIP LENGTH (in): 3.31
TIP LENGTH (cm): 8.41
BAY SPACING (in): 54.44
BAY SPACING (cm): 138.28
GROUNDING RING POSITION: 2

ANTENNA INPUT = 7/16 DIN CONNECTOR - FEMALE (MATING LINE MUST HAVE A 7/16 DIN MALE CONN.)

RED BAND & WEEP HOLE THIS END (DOWN)

BRACKETS & HOSE CLAMPS FOR MOUNTING ARE SUPPLIED WITH POWER DIVIDER

PROJECT NO.: AE-100A-4F-HW
DRAWN BY: K. SCHARP 7/13/2016
DESIGN MGR.: A. A. NORMAND 7/13/2016
DRAFTING: K. SCHARP 7/13/2016
SUPERSEDES PART NO.: CLR 1/25/2016

NO. 1 2 3 4 5 6 7 8 9 10

1. PLACE DECIMAL x 3
2. PLACE DECIMAL x 4
3. PLACE DECIMAL x .010
4. ANGULAR x .5° FRACTIONAL x 1/16"