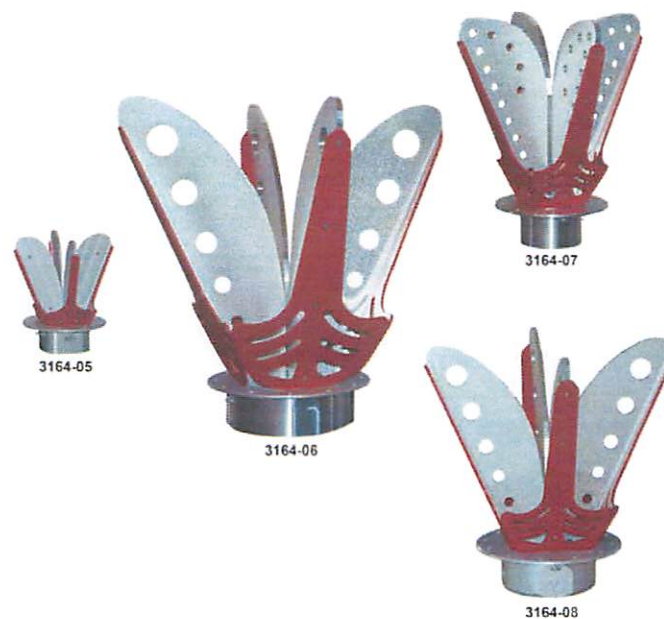


Model 3164 Series

Open-Boundary Quad-Ridged Horns

User Manual



 **ETS-LINDGREN**TM
An ESCO Technologies Company

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Revision Record
MANUAL,OBCH ANTENNA,3164 SERIES | Part #399288, Rev. B

| Revision | Description | Date |
|-----------------|---|----------------|
| A | Initial Release | March, 2007 |
| B | Added 3164-08; updated 3164-05 mounting bracket; converted to half-size | February, 2008 |

1.0 Introduction

The ETS-Lindgren Model 3164 Open-Boundary Quad-Ridge Horns include the 3164-05, 3164-06, 3164-07, and 3164-08 antennas. The Model 3164 Series was designed for antenna pattern measurement ranging from the ultra high frequency (UHF) to the Ku band. Each antenna is a dual linear polarized open boundary horn that allows the user to measure the principal polarizations of the field radiated by the antenna under test.



The Model 3164 Series antennas are precision machined from aluminum and PVC. Two orthogonally-placed input connectors permit simultaneous measurements for horizontal and vertical polarizations for linearly polarized electromagnetic waves. By using an additional 90-degree hybrid phase shifter, the antennas may be used to transmit or receive circularly polarized electromagnetic waves.

Testing of the Model 3164 Series shows that the isolation level between the two orthogonal test ports is better than 24 dB in the specified operating frequency range. The port isolation is the limiting factor in the cross-polarization levels of the antenna.

The Model 3164 Series antennas are designed to operate from 300 MHz to 18 GHz in a free-space environment. When the antenna is installed in a rectangular shielded anechoic chamber, the equipment under test must be at a test distance meeting the far field requirements to operate either antenna within the full frequency range.

In a quasi-free space test environment such as a tapered anechoic chamber, the Model 3164 Series antennas are ideal plane-wave transmit and receive antennas. They are ideal for use in a taper chamber over the entire range, provided it is repositioned inside the taper to obtain the optimum illumination.

Model 3164-05

The **3164-05** is the smallest of the Model 3164 Series, with an operating range of 2 GHz to 18 GHz.

The 3164-05 is designed for the antenna measurement in the MW range, and covers the S, C, X, and Ku bands. It was designed as a receive antenna, but can be used as a low power radiator with a maximum continuous power handling capability of 10 W.



Model 3164-08

The **3164-08** is the larger of the medium-sized antennas of the Model 3164 Series, with an operating range of 700 MHz to 10 GHz.

With the highest gain in the 5.8 GHz range, the 3164-08 is ideal for WiMAX™ testing. Additional applications include UWB wireless testing (3 GHz to 10 GHz) and lower frequency testing (700 MHz to 3 GHz) for applications such as GSM, PCS, and WiFi.



3.0 Maintenance

Annual Calibration

To ensure reliable and repeatable long-term performance, annual recalibration of your antenna by an ETS-Lindgren experienced technician is recommended. Our staff can recalibrate almost any type or brand of antenna. Please call to receive a Service Request Order (SRO) prior to sending an antenna for calibration.

For more information about our calibration services, visit our website at www.ets-lindgren.com/calibration.

Replacement and Optional Parts

Use the following table to order replacement or optional parts for the Model 3164 Series.

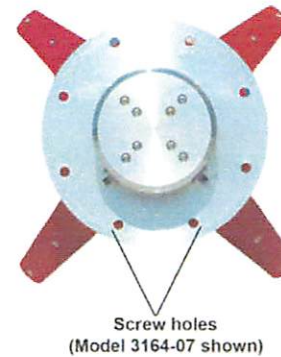
| | Part Description | Part Number |
|----------------|---------------------------------------|-------------|
| 3164-05 | Tripod | 7-TR |
| | Bracket mount | 108071 |
| | Knob for bracket mount, 1/4–20 thread | H-34JCL-34 |
| | Center rotation boom assembly | 108197 |
| | Stinger for center rotation mount | 108070 |
| | 1/4–20 set screw for Stinger | 910467 |
| | SMA connector (2) | 512082 |
| 3164-06 | Bracket mount | 106974 |
| | Knob for boom mount | 104136 |
| | SMA connector (2) | 512082 |

| | Part Description | Part Number |
|----------------|----------------------------------|--------------------|
| 3164-07 | Tripod | 7-TR |
| | Bracket mount | 106974 |
| | Threaded insert for tripod mount | 105861B |
| | Knob for boom mount | 104136 |
| | SMA connector (2) | 512082 |
| 3164-08 | Tripod | 7-TR |
| | Bracket mount | 112859 |
| | Threaded insert for tripod mount | 105861B |
| | Knob for boom mount | 104136 |
| | SMA connector (2) | 512082 |

4.0 Mounting the Model 3164 Series

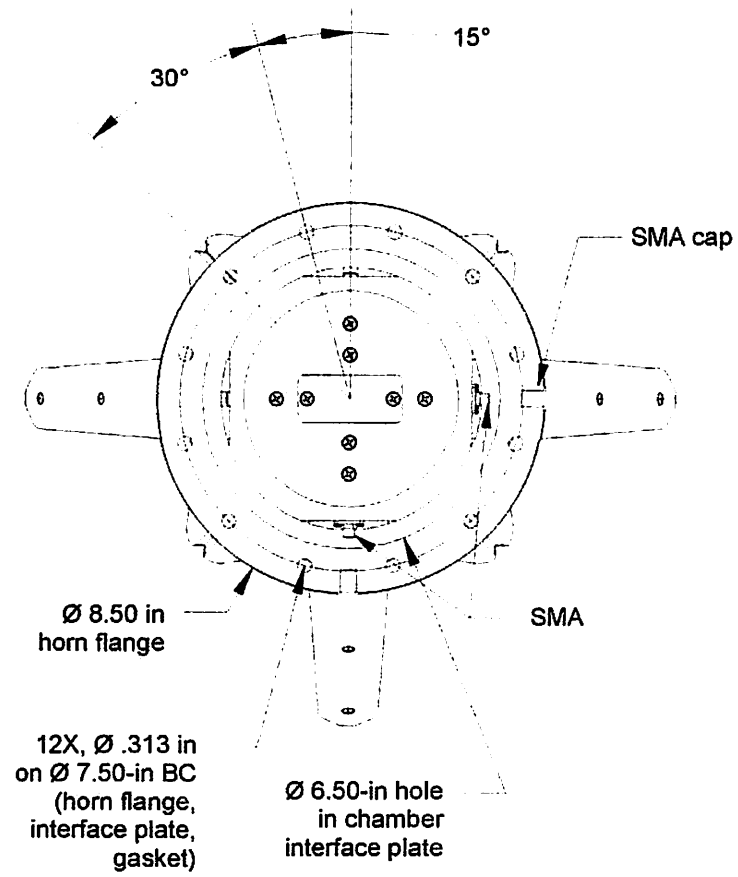
The Model 3164 Series Open-Boundary Quad-Ridge Horns are designed to mount directly on the shield line of a shielded anechoic chamber. Mounting features include:

- **Chamber wall mounting holes—** Equidistant holes around the circumference of the adapter plate accept 1/4–20 thread screws and nuts for mounting to a chamber wall. The Model 3164-06 provides twelve holes, and the Model 3164-07 provides eight.

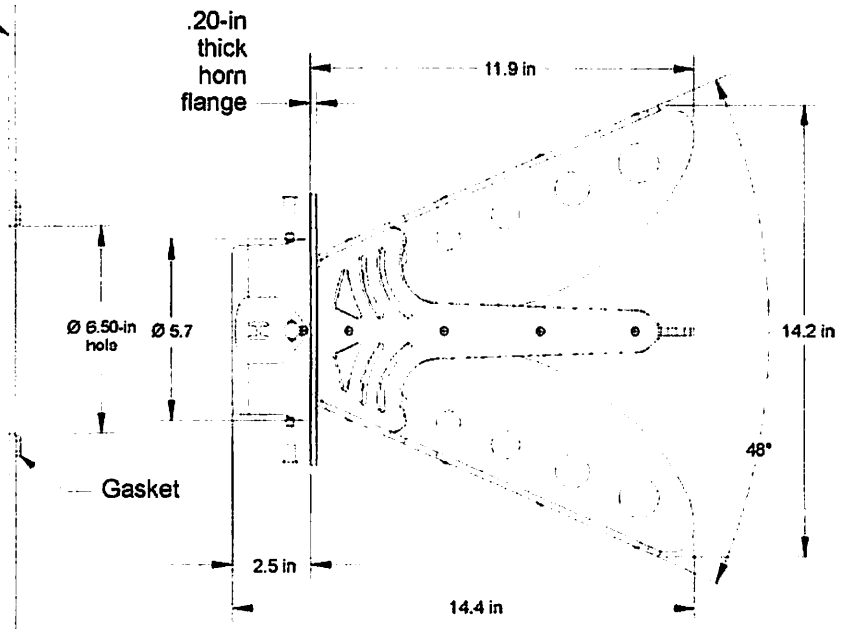


- **Easy access to SMA connectors—**The circular mounting plate provides the primary interface to the shielded enclosure mount panel. By fastening the mounting plate to the shielded enclosure, the two SMA connectors are on the outside of the enclosure, providing easy access. This also puts the cables outside of the enclosure, which reduces the effect of the cables on the measurement.
- **Security of shielding integrity—**The back end of the antenna is machined of a single aluminum block, so the shielding effectiveness of the enclosure is not compromised by installation. This unique feature eliminates the need for a transmit antenna positioning device or a walk path inside the shielded anechoic chamber, both of which could present unwanted reflections of shielded anechoic chambers when installed improperly.
- **Maximize test range distance—**The integrated mount fixture allows maximizing of the test range distance for a shielded anechoic chamber of defined dimensions.

Chamber Wall Mount Illustrations for Model 3164-08



.188-in thick chamber interface plate

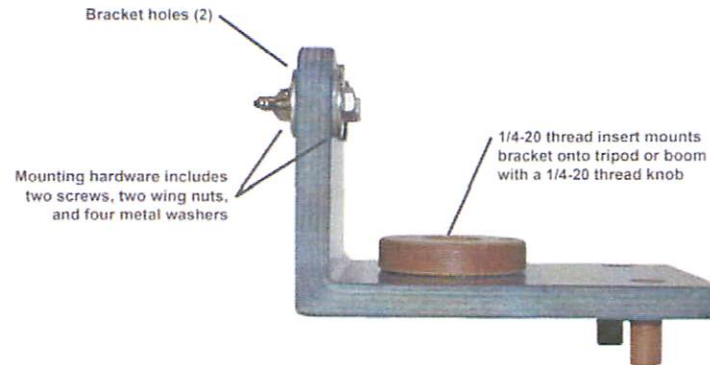


Bracket Mount Instructions for Model 3164-06, Model 3164-07, and Model 3164-08

CAUTION

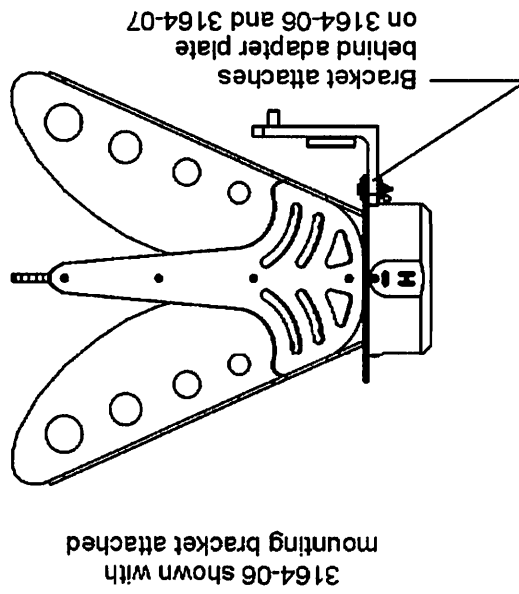
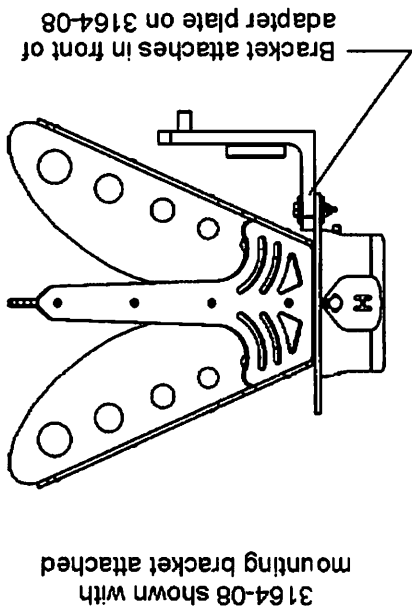
Due to the size and weight of the Model 3164-06, do not mount it onto a tripod. When using the bracket, only mount the Model 3164-06 onto a boom.

An L-shaped mounting bracket is included with the antenna. The bracket mounts the Model 3164-06 onto a boom, and the Model 3164-07 and 3164-08 onto a tripod or boom. Bracket hardware includes two screws, two wing nuts, and four metal washers.



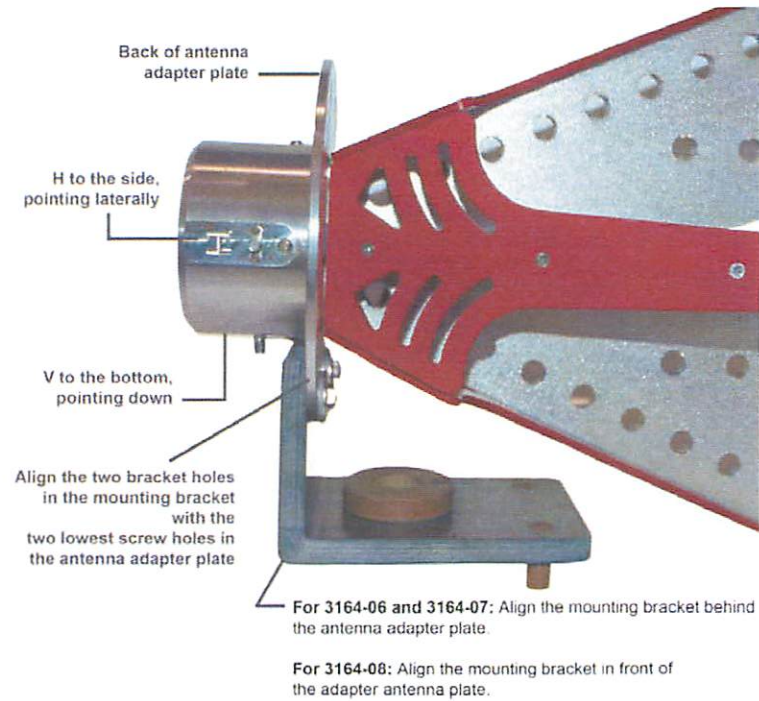
Included with the bracket are two mounting adapters:

- 1/4–20 thread insert that fastens to a 1/4–20 screw on the tripod or boom
- 1/4–20 thread knob that attaches the bracket to the tripod or boom



To attach the mounting bracket:

1. Place the antenna in a stable position and location to prevent it from falling or rolling while attaching the bracket.
2. Orient the antenna so the **H** (horizontal) mark is at the side pointing laterally, and the **V** (vertical) mark is at the bottom, pointing down.



3. With the antenna oriented, align the two bracket holes in the mounting bracket with the two lowest screw holes in the antenna adapter plate.
 - For Model 3164-06 and 3164-07, align the mounting bracket on the back of the adapter plate.
 - For Model 3164-08, align the mounting bracket on the front of the adapter plate.

4. Thread a washer onto a screw. From the front of the antenna adapter plate, insert the screw and washer through one of the bracket holes.
5. On the back of the mounting bracket, thread a washer onto the screw, and then tighten a wing nut onto the screw.
6. Repeat for the remaining bracket hole.

14.0 Specifications

Electrical Specifications

| | Model 3164-05 | Model 3164-06 | Model 3164-07 | Model 3164-08 |
|---------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Frequency Range: | 2 GHz – 18 GHz | 300 MHz – 6 GHz | 700 MHz – 6 GHz | 700 MHz – 10 GHz |
| Max VSWR: | < 3.25:1 | < 6.5:1 | < 6.5:1 | < 3:1 |
| Gain over Operating Frequency: | See <i>Gain</i> data on page 37 | See <i>Gain</i> data on page 51 | See <i>Gain</i> data on page 57 | See <i>Gain</i> data on page 67 |
| Maximum Continuous Power: | 10 W | 20 W | 20 W | 20 W |
| Impedance (Nominal): | 50 Ω | 50 Ω | 50 Ω | 50 Ω |
| Connector: | SMA (2) | SMA (2) | SMA (2) | SMA (2) |
| Cross Polarization Isolation: | > 24 dB | > 25 dB | > 25 dB | > 20 dB |
| Dual Polarization Symmetry: | See <i>Gain</i> data on page 37 | See <i>Gain</i> data on page 51 | See <i>Gain</i> data on page 57 | See <i>Gain</i> data on page 67 |

Physical Specifications

| | Model 3164-05 | Model 3164-06 | Model 3164-07 | Model 3164-08 |
|----------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Height: | 17.1 cm 6.7 in | 50.80 cm 20 in | 30.99 cm 12.2 in | 36.07cm 14.2 in |
| Width: | 17.1 cm 6.7 in | 50.80 cm 20 in | 30.99 cm 12.2 in | 36.07 cm 14.2 in |
| Depth: | 18.6 cm 7.3 in | 50.80 cm 20 in | 35.81 cm 14.1 in | 36.58 cm 14.4 in |
| Weight: | 0.7 kg 1.5 lb | 9.5 kg 21 lb | 4 kg 9 lb | 5.1 kg 11.4 lb |