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CAMI™ Broadband AM Isocouplers

Installation and Application Manual

REACH SOUND
FARTHER, BETTER®

LBA Technology, Inc. Greenville, NC, USA

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NOTICE

This Instruction Manual is prepared by LBA Technology, Inc. specifically for the use by the purchaser and the ultimate users of the **CAMI™ Broadband AM Isocouplers** for the proper installation and operation of same, as described herein. This Instruction Manual is the exclusive property of LBA Technology, Inc. All information and designs herein are proprietary and confidential to LBA Technology, Inc. and shall be used for no other purpose, and shall be disseminated to no other party, except as specifically authorized by LBA Technology, Inc. Unauthorized reproduction for any purpose, by any means whatsoever, is specifically prohibited.

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DISCLAIMER OF LIABILITY

Since installation conditions may vary and are beyond the control of LBA Technology, Inc., it is the sole responsibility of the purchaser to determine that this equipment is suitable for its intended use. LBA Technology, Inc. assumes no responsibility for actual mechanical or electrical performance in the customer's installation, nor does it assume any liability, consequential or otherwise, for the damages resulting from the improper use of this equipment.

CAMI™ Broadband AM Isocouplers

INSTALLLATION AND APPLICATION MANUAL

1. OVERVIEW

LBA Technology's **CAMI™** series of new-concept broadband medium-power isocouplers permit a wide variety of antennas to be mounted on "hot" AM towers by isolating the transmission lines from the host AM tower. These systems offer a simple, economical solution to take full advantage of existing vertical real estate.

CAMI™ Coaxial Isocoupler systems are specifically targeted to isolate single coaxial cables as for FM translators, low power FM, STL's, and television translators. The CAMI™ is transparent to the type of signal being sent through it, within its frequency and power limits. Your CAMI™ Isocoupler also can pass AC or DC current to tower top amplifiers.

Your **CAMI™** is designed to provide a minimum AM impedance of 2000 ohms across the AM frequency range on the nameplate. At or near the center of that range, the impedance typically will be over 10,000 ohms. For most towers in common use for AM, 2000 ohms shunt reactance will make only a minor change in tower impedance.

Any time that transmission lines and antennas are placed on an AM tower, the impedance of the tower will change to some degree. No prior FCC permission is required to install a **CAMI™** on an AM tower. On completion of the overall installation, the base impedance should be remeasured and FCC Form 302 filed, if different from the licensed value.

When installing transmission lines and antennas on towers in a directional array with a **CAMI™**, it is recommended that the tower with the lowest operating impedance and power across the directional modes be chosen to minimize any impact of the installation. If possible, choosing a tower that is unused in one DA mode will facilitate maintenance of the auxiliary installation. A competent person should verify that the directional array meets its license parameters, or return them to its licensed parameters after the installation. If needed an FCC Form 302 should be filed.

When installing any equipment on an insulated AM tower, complying with good practices for RF safety and lightning protection is essential. LBA does not warranty **CAMI's** against lightning damage. We recommend the following:

- A properly adjusted and functioning lightning gap across the base insulator is essential.
- The lightning gap should be adjusted to the point where high modulation peaks occasionally arc, then backing off just a little until arcing stops.
- Have a functioning static drain path across the base to ground.

2. INSTALLATION PROCEDURES FOR CAMI500™ & CAMI1800™

Note that these **CAMI™** models come with an insulated mounting kit. The pictures show the typical mounting on tower. The same kit enables mounting on a separate post, or horizontally under an ice bridge. Although mounting options are flexible, the following considerations should be kept in mind:

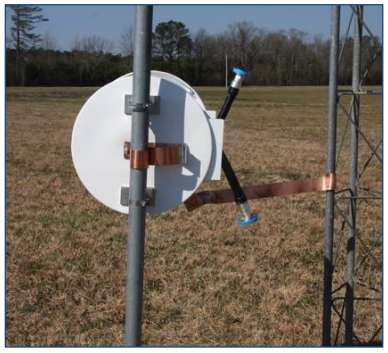
- Keep the **CAMI™** body at least six inches away from metal or conductive objects.
- The "Input" connector is the "Cold" end and the associated stud should go directly to the antenna system ground using copper strap one inch wide or greater.
- The "Output" connector is the "Hot" end and the associated stud should go as directly as possible to the adjacent tower structure using a copper strap one inch wide or greater.
- The CAMI1800™ has connectors on a "pigtail". These may be bent as needed, but bends must have a radius of five inches or greater
- Weatherseal both coaxial connectors after installation,
- The **CAMI™** is factory-adjusted. Opening the case is unnecessary and voids the warranty.

3. INSTALLATION PROCEDURES FOR THE CAMI5000™

Note that your **CAMI5000™** comes with a mounting assembly built into one end of the case. The picture shows how the typical mounting on a tower is configured. The integral mounting structure provides two studs to which mounting hardware is attached. Your system is preconfigured with universal clamps equipped with steel bands adequate to fit any mounting member up to six inches in diameter. The mounts are able to be aligned at any angle to permit use of a variety of structure configurations.

When the **CAMI5000™** is mounted directly on a "hot" AM tower, the tower, the mounting structure, and the connector labeled "1" are all at AM potential. A copper tab is also provided on that end of the case for a connection as directly as possible to the tower, using a copper strap one inch wide or greater.
That connector goes to the coaxial cable to the auxiliary antenna being isolated.

In that configuration, the connector labeled "2" is the "Cold" end and attaches to the coax to the transmitter. The associated copper tab should go to the AM antenna ground system as directly as possible, using a copper strap one inch wide or greater.



If the **CAMI5000™** is attached to a post or ice bridge grounded structure near the tower, "Hot" and "Cold" ends will be reversed!

In that case, the mounting hardware and Connector #1 will be at ground potential and the connector feeds the coax to the transmitter. The ground tab should connect as directly as possible to the AM antenna ground.

Connector #2 will be "Hot" and connect to the coax cable going up the AM tower. The associated copper tab should connect as directly as possible to the AM tower.

Several considerations should be observed:

- Keep the **CAMI5000™** body at least six inches away from metal or conductive objects, other than its provided mounting hardware,
- If not mounting on the AM tower, keep the **CAMI5000™** within three feet of the tower,
- If equipped with other than EIA connectors, weatherseal both coaxial connectors after installation,
- While the cable "stalks" may be adjusted as needed, be sure to use a radius of curvature that is ten inches or greater.
- The **CAMI5000™** is factory-adjusted. Opening the case is unnecessary and voids the warranty.

4. TROUBLESHOOTING

Your **CAMI™** is designed with two fail-safe features.

- The coaxial transmission line within the **CAMI™** for your FM or other system on the host AM tower is continuous and is not susceptible to failure if used within its ratings, even if the AM isolation fails.

- The most probable AM isolation failure is a tuning capacitor "open", changing the apparent impedance of the isolator. Even in a failure state, an isolation impedance of approximately +j180 ohms (540 kHz) to +j550 ohms (1710 kHz) remains. This is adequate to allow continued operation with any adquate Antenna Tuning Unit (ATU) until repair or replacement can be accomplished.

BEFORE UNDERTAKING ANY MAINTENANCE, ENSURE THAT THE RF POWER IS OFF TO BOTH THE AM AND COAXIAL CABLE SOURCES!

If a **transmission line failure** is suspected, the coaxial cables attached to the **CAMI™** input and output should be detached and a 50 ohm load attached to the output. The preferred test is to attach a time domain reflectometer and observe the condition of the coaxial cable path. A VSWR meter and calibrated load may also be used to ascertain that the VSWR at the frequency in use is within specifications.

IF an **AM isolation failure** is suspected, remove the coaxial cables and the bonding strap to the tower and ground. Using an RF bridge, VNA, or a vector impedance meter, measure the impedance between the outer shells of the coax connectors at the AM frequency. In a properly operating CAMI™ the RF impedance (Z) should be above 2000 ohms when observed on a vector meter. Using an RF bridge the resistance (R) and reactance (X) readings will need to be combined to compute the impedance (Z). The value of Z is $Z = \sqrt{(R^2 + X^2)}$. A reactance (X) reading between approximately +j180 and +j550 ohms (depending upon test frequency) indicates an open capacitor.

In rare instances a capacitor may fail to a "short condition". In this case a low or zero resistance value should be observed.

Should any of these abnormal conditions be noted, please contact LBA for assistance and instructions. The **CAMI's** are factory-adjusted. Opening the case is unnecessary and voids the warranty

Support:
For assistance in use and installation, call LBA Technology, Inc. at 252-757-0379 or email at lbagrp@lbagroup.com.

The CAMI™ systems carry a two year warranty against manufacturing defects. LBA is not responsible for defects arising from user installation or application. For repair or warranty, please contact LBA with full details of the problem you have encountered and support that you require. Please do not return units without a return authorization.

The PDF data sheet on the nex page, the **CAMI**™ AM broadband isocouplers, may be downloaded at https://www.lbagroup.com/images/PDFs/cami-spec-sheet.pdf and should be consulted for operational limitations before putting your CAMI into use.

NOTE: Specifications and prices are subject to change without notice.

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3400 Tupper Dr. | Greenville, NC 27834 | 252-757-0279 | www.lbagroup.com

Specification	CAMI 500 TM	CAMI 1800 TM	CAMI 5000 TM
Price	**discontinued**	**Starting at $3,550**	**Starting at $4,675**
Transmission Path Performance			
Frequency range (min)	DC - 2700 MHz	DC - 2700 MHz	DC - 2700 MHz
Impedance	50 ohms	50 ohms	50 ohms
VSWR (typical)	< 1.3 : 1	< 1.25 : 1	< 1.2 : 1
CW Power rating (at 40°C and 1.5 VSWR)			
100 MHz	475 watts	1800 watts	5100 watts
1000 MHz	125 watts	550 watts	1500 watts
2500 MHz	75 watts	325 watts	900 watts
Insertion loss (typical)			
100 MHz	0.6 dB	0.4 dB	0.2 dB (max)
1000 MHz	1.4 dB	1.3 dB	0.7 dB (max)
2500 MHz	3.4 dB	2.2 dB	1.1 dB (max)
Coaxial connectors	Type N female	7/16 DIN female	7/8" EIA or 7/16 DIN female
DC power passing	Yes (2 A)	Yes (5 A)	Yes (10 A)
AM Isolation Performance			
Frequency range	530 kHz - 1710 KHz	530 kHz - 1710 KHz	530 kHz - 1710 kHz
Isolation frequency	Single, customer specified*	Single, customer specified*	Single, customer specified*
AM RF impedance	> 2000 ohms	> 3000 ohms	> 3000 ohms
AM base volts (max, standard)	3500 volts peak	3500 volts peak	3500 volts peak
Physical and Environmental			
Dimensions	24" long, 7" Φ (61 cm x 17.8 cm Φ)	31" long, 9" Φ (78.8 cm x 22.9 cm Φ)	19" long, 17" Φ (48.3 cm x 43.2 cm Φ)
Weight	13 lb (5.9 kg)	25 lb (11.34 kg)	70 lb (31.75 kg)
Mounting orientation	Vertical	Horizontal or vertical	Horizontal
Mounting method	FG standoffs	FG standoffs	Tower/post brackets
Temperature	-40°C to +50°C (-40°F to 122°F)	-40°C to +50°C (-40°F to 122°F)	-40°C to +50°C (-40°F to 122°F)
Humidity	Weatherproof	Weatherproof	Weatherproof

*Diplexed and triplexed AM isolation can be accommodated on special orders.

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For Orders & Quotes
Contact Us at:
lbagrp@lbagroup.com