

Models 7007-001 and 7007-002

EMSense™ EMF Probe Plug-In Card

User Manual



Copyright and Trademark

ETS-Lindgren Inc. reserves the right to make changes to any products herein to improve functioning or design. Although the information in this document has been carefully reviewed and is believed to be reliable, ETS-Lindgren Inc. does not assume any liability arising out of the application or use of any product or circuit described herein; nor does it convey any license under its patent rights nor the rights of others. All trademarks are the property of their respective owners.

© Copyright 2015–2022 by ETS-Lindgren Inc. All Rights Reserved. No part of this document may be copied by any means without written permission from ETS-Lindgren Inc.

Trademarks used in this document: The *ETS-Lindgren* logo is a registered trademark, and *EMCenter*, *EMSense*, *TILE!*, and *EMQuest* are trademarks of ETS-Lindgren Inc.

Revision Record

MANUAL, EMSENSE | Part #399347, Rev. C

Revision	Description	Date
A	Initial Release	MAR, 2015
B	Added password to enable laser	AUG, 2016
C	Updated format	SEP, 2022

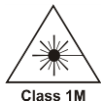
Safety Information



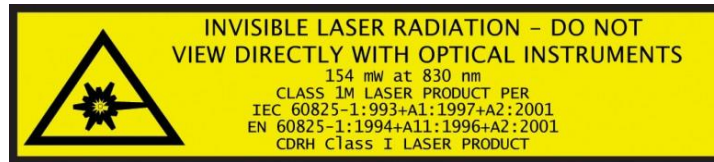
High Voltage: Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.



Protective Earth Ground (Safety Ground): Indicates protective earth terminal. You should provide uninterrupted safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.



Laser Warning: Laser power up to 150 mW at 830 nm may be accessible at the fiber connector of the laser. However, the laser beam itself is not hazardous as the interlock ensures that the exposure time will be less than 30 ms.



Waste Electrical and Electronic Equipment (WEEE) Directive: (European Union) At end of useful life, this product should be deposited at an appropriate waste disposal facility for recycling and disposal. Do not dispose of with household waste.

Notes, Cautions, and Warnings



Note: Denotes helpful information intended to provide tips for better use of the product.



CAUTION: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.



WARNING: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.

Table of Contents

Copyright and Trademark	2
Revision Record	2
Safety Information.....	3
Notes, Cautions, and Warnings.....	3
Table of Contents.....	4
Introduction	6
Standard Configuration	6
Model 7007-001 EMSense for Battery-Operated Probes	6
Model 7007-002 EMSense for Laser-Powered Probes	7
Other Optional Items.....	7
ETS-Lindgren Product Information Bulletin.....	7
Operation	8
Installation	8
Changing Plug-In Cards.....	8
Laser Safety	9
Safety Precautions	9
Safety Features	10
Manual Control	12
Back Panel.....	12
Touchscreen	14
Remote Control.....	16
Command Set.....	17
EMSense Plug-In Cards 7007-001/-002.....	17
EMSense Laser Card 7007-002 Only.....	18
Error Codes	20
Maintenance	21
Fiber Optic Maintenance	21
Service Procedures.....	22
Contacting ETS-Lindgren.....	22
Replacement and Optional Parts	22
Sending a Component for Service	22
Calibration Services and Annual Calibration.....	22
Specifications.....	23
Physical Specifications.....	23

Environmental Specifications	23
Appendix A: Warranty	24
Scope and Duration of Warranties.....	24
Warranty Exclusions	25
Buyer's Remedies.....	26
Appendix B: EC Declaration on Conformity	27

Introduction

The ETS-Lindgren Model 7007-001 EMSense™ EMF Probe Plug-in Card is designed for use with the following ETS-Lindgren battery-operated field probes; the Model 7007-002 EMSense card is designed for use with the following ETS-Lindgren laser-powered field probes (sold separately). Each EMSense card can support one ETS-Lindgren probe.



Standard Configuration

Standard configuration may vary by model; contact ETS-Lindgren for additional information.

- EMCenter Modular RF Platform
- EMSense Plug-In card
- Compatible Probe(s)



Note: Contact ETS-Lindgren for information on ordering probes. For complete information on ETS-Lindgren field probes, see the *EMC Field Probes User Manual* included with the probe.

Model 7007-001 EMSense for Battery-Operated Probes



HI-6022



HI-6053



HI-6005

Model 7007-002 EMSense for Laser-Powered Probes



HI-6122



HI-6153



HI-6105

Other Optional Items

- Contact ETS-Lindgren for additional information on other compatible probe models.
- EMSense is fully supported by ETS-Lindgren TILE!™ (Totally Integrated Laboratory Environment), ETS-Lindgren EMQuest™ Data Acquisition and Analysis Software, and other test automation software packages. Contact ETS-Lindgren for additional information.

ETS-Lindgren Product Information Bulletin

See the ETS-Lindgren *Product Information Bulletin* included with your shipment for the following:

- Safety, regulatory, and other product marking information
- Steps to receive your shipment
- Steps to return a component for service
- ETS-Lindgren calibration service
- ETS-Lindgren contact information

Operation

Installation



CAUTION: Before connecting any components, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.



WARNING: Always unplug the unit before starting maintenance to prevent electrical shock. Maintenance includes removal of the plug-in cards or the top panel.



CAUTION: Leave an empty slot or space 1U in height beneath the EMCenter to allow sufficient cooling through the bottom air inlets of the cabinet.

Changing Plug-In Cards

1. Before installing and inserting a new plug-in card make sure that the EMCenter is turned OFF and disconnect the AC Mains power cord.
2. Determine in which empty slot of the EMCenter you want to install the Plug-in Card. Looking at the back of the EMCenter, the slots are numbered 1 through 7 from left to right.



Note: Due to the width of some cards, two consecutive empty slots are required for installation. The card will use the track of the first of the two slots.

3. Remove the blank panel from the slot by removing the two screws at the top of the blank panel and the two screws at the bottom. Be careful not to lose the screws.
4. Carefully insert the card into the slot of the EMCenter. . Position the plug-in card into the slot and slowly push it, using the lower part of the plug-in card. When it reached the end of the rail, gently push and lock the plug-in card into the backplane socket.
5. Secure the card by tightening the four previous screws using a Pozi type screwdriver head PZ1.
6. Re-connect the AC mains power cord and turn ON the EMCenter. It can now be started by tapping the touch screen. The EMCenter will automatically detect the newly installed EMGen card.
7. **If applicable:** Connect the sensors to the correct plug-in card port.
8. **Optional:** Connect the EMCenter to a personal computer using RS-232, Ethernet, or GPIB.
9. Plug the interlock into the connector on the back of the EMCenter.
10. The card installation is complete and the EMCenter is now ready for use. You can control all cards through the [touchscreen](#) or sending [remote commands](#).

Laser Safety



CAUTION: For additional safety information, see the ETS-Lindgren Product Information Bulletin included with your shipment.

Safety Precautions



LASER RADIATION AVOID EXPOSURE TO BEAM CLASS 3B LASER PRODUCT

- **WAVELENGTH 808 nm**
- **OPTICAL POWER 0.5 W**



CAUTION: Never look into any of the fiber optic connectors.

- The laser emits an infrared beam that is invisible to the naked eye.
- Direct or even reflected light will cause permanent eye damage.



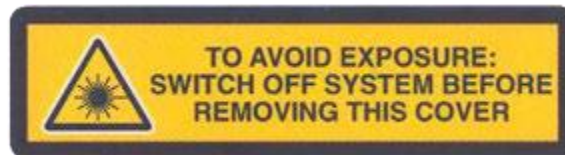
INVISIBLE LASER RADIATION: Do not stare into beam or view directly with optical instruments.

- Avoid eye or skin exposure to direct or scattered radiation.

Some EMCenter™ Modular RF Platform plug-in cards use a high power laser to supply energy to a remote (floating) measuring device. The wavelength of these lasers is approximately 808 nm. These lasers are high-power, infrared lasers and invisible to the human eye. Please read the documentation and safety instructions provided in the separate manual for the specific card.

Exposure to any laser radiation during normal operation is not likely because the EMCenter uses only fiber-coupled lasers. However, for the safety of all employees, please comply with the following rules:

- When the EMCenter is not in use, power off the unit.
- The remote interlock connection should be connected to an emergency master disconnect and in series with the room door or fixture interlocks.
- Connect all fiber cables and install protective covers before switching on the system. Protective covers are identified by the following label:



- Do not attempt to turn on the EMCenter if the fiber optic cables show any sign of damage.

Safety Features

To make the EMCenter as safe as possible, the primary safety system of each plug-in card is designed to work standalone, without any intervention from the EMCenter. Apart from this, the EMCenter has its own safety interlock system, which is connected in series with the interlock system of every installed card.

Additionally, the following safety measures are implemented:

- The EMCenter is equipped with a remote interlock system. For example, this interlock system would prevent inadvertent laser radiation by preventing someone from entering a shielded room and stepping on a fiber.
- To prevent accidental activation of the laser, an Acknowledge button will appear directly after the Laser Start button is pressed. The laser will start only if this button is pressed within a four-second timeframe.
- A visual Laser On indicator warns the operator of laser activity. The Laser On LED on the front panel of EMCenter indicates that at least one laser is active.

Manual Control



Note: For operational information for ETS-Lindgren field probes, see the *EMC Field Probes User Manual* included with the probe.

Back Panel

Connectors

Note: Model 7007-001 EMSense card shown to the right; connectors may vary for Model 7007-002

- Transmit (yellow)
- Receive (white)



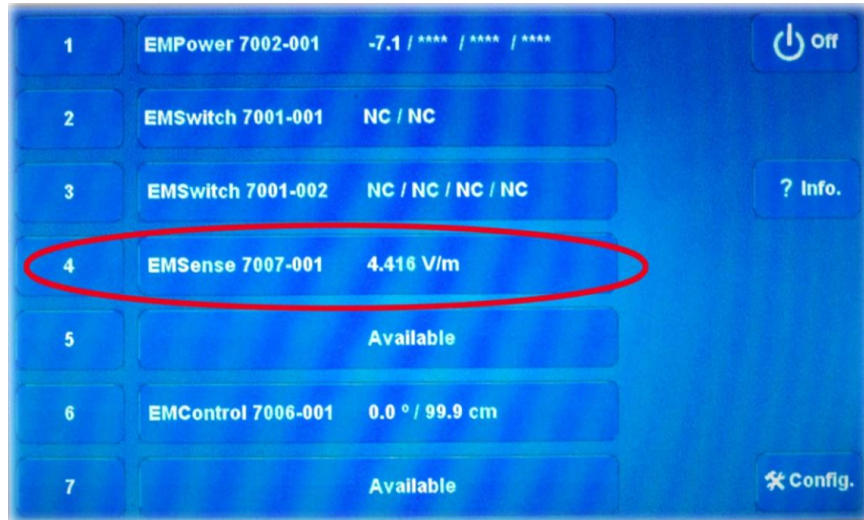
Indicator LEDS for 7007-002/Laser Only

- **LASER HOT (red)**
 - **Constant On:** This is a warning that the laser is running too hot and the system should be checked. Dirty fiber ends, poor in-line connections, or damaged fiber optic cables are among the causes of a **LASER HOT** warning. The system should be shut down as soon as possible, and the cause of the additional heat investigated. Continuing to run in a **LASER HOT** state may reduce the life of the laser.
 - **Flash:** This is an indication that the laser current is approaching 0.8 mA. During the initialization phase of the startup process the probe receives more light; once the probe is powered and communicating, the power is rolled back to a normal level. In these instances the user may see **LASER HOT** flash on; this is normal operation.
- **LASER OK (blue):** This is the normal status when probe communication is established and laser light is provided to the probe for power.
- **RECEIVE (amber):** Indicates normal communication between the probe and the EMSense card.
- **TRANSMIT (white):** Indicates normal communication between the EMCenter and the EMSense card.
- **POWER (Green):** This indicates that the EMCenter recognizes the EMSense card and is providing power.

Touchscreen

Battery-Operated Field Probe Data: For 7007-001 Only

On the Home screen, the status box to the right of the slot number for the installed EMSense card displays the isotropic field strength data.



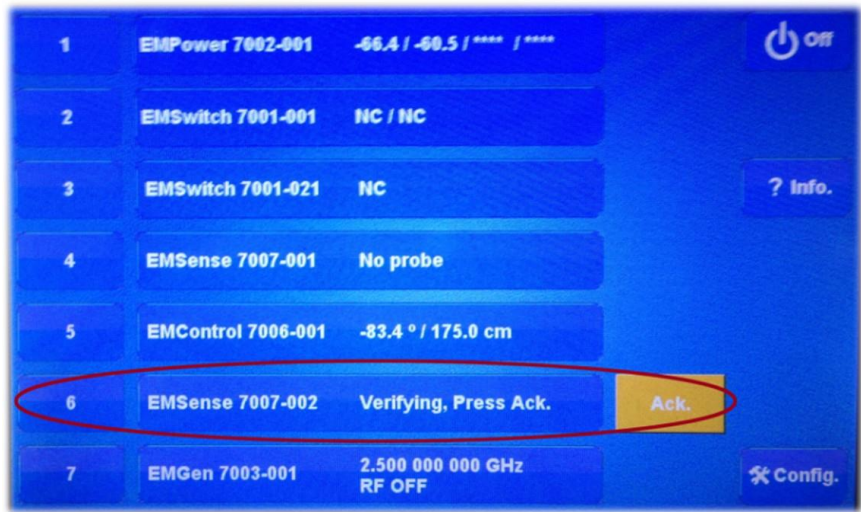
1. Press the status box to display the following screen:



Laser-Powered Field Probe Data: For 7007-002 Only

On the Home screen, the status box to the right of the slot number for the installed EMSense card displays the connected laser-powered field probe.

- 1. Press the status box and **Ack.** will display.



- 2. Press **Ack.** and **LASER ON** will display on the front panel. The password to enable the laser is **3447**.
- 3. Press the status box again to display the data for the probe.



Remote Control



Note: To use the EMSense remote commands, see the EMCenter manual for examples and the full command list.

Command Set

EMSense Plug-In Cards 7007-001/-002

B

Description	Read probe converter voltage
Response	:Bxx.xx

BP

Description	Read probe converter voltage in hexadecimal format
Response	:B64N • N = safe operating level • F = fail level Voltage reported as 0–64; 64 corresponds to 100% Note: The BP command is provided for backward compatibility and should not be used to monitor the converter voltage, which always responds with :B64N<LF>

D3

Description	Read probe data
Response	:Dx.xxxxyy.yyzzz.zB • xxxx, yyyy, zzzz = 4-digit axis values with floating decimal point • B = battery flag, N or F

D5

Description	Read probe data
Response	:Dx.xxxxyy.yyzzz.zcccc.B • xxxx, yyyy, zzzz = 4-digit axis values with floating decimal point • cccc = composite field value with floating decimal point • B = battery flag, N or F

I

Description	Identification command. Note: The Identification command, I , may also be used as the first command sent. The command will turn on the laser. Once communication between the probe and the HI-6113 is established, the return string will be sent. Subsequent I commands immediately send the return string
Response	:I6105<sr><sn><cd>B • sr = 10-character software revision • sn = 8-character serial number • cd = 8-character calibration date • B = battery flag, N or F

TC

Description	Read temperature in Centigrade
Response	:Txxxx

TF

Description	Read temperature in Fahrenheit
Response	:Txxxx

<Null><CR>

Description	Send the ASCII null character. Note: <Null><CR> is a special command that can be used as the initial command to the field probe after it is turned on.
Response	:N<LF>

EMSense Laser Card 7007-002 Only

i

Description	Laser data interface identification string
Response	:i6113<sr><sn> • sr = 10-character software revision • sn = 8-character serial number

n

Description	Read laser current
Response	:nX.XXX

o

Description	Laser OFF command. The laser and all LEDs except the green Power LED will turn off.
Response	:o

r

Description	Laser ON command. The blue Laser LED will illuminate immediately, then the yellow Receive LED will illuminate a few seconds after, indicating the probe is ready for operation. Note: The Laser ON command, r, should be the first command sent.
Response	:r

tc

Description	Read temperature in Centigrade
Response	:txxxx

tf

Description	Read temperature in Fahrenheit
Response	:txxxx

Error Codes

Error Code	Description
E1	Communication error (for example, overflow)
E2	Buffer full error; too many characters contained between the start character and carriage return sequence
E3	Received command is invalid
E4	Received parameter is invalid
E5	Hardware error (for example, EEPROM failure)
E6	Parity error
E7	Probe commands are not available unless the field probe is powered on. To power on the probe, send the Laser ON command, r . Note: For 7007-002 / laser only
E9	Received command is invalid

Maintenance



CAUTION: Before performing any maintenance, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.



WARNING: Maintenance of the EMCenter is limited to external components such as cables or connectors. If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.



If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.



Note: For maintenance information for ETS-Lindgren field probes, see the *EMC Field Probes User Manual* included with the probe.

Fiber Optic Maintenance

Fiber optic connectors and cables can be damaged from airborne particles, humidity and moisture, oils from the human body, and debris from the connectors they plug into. Always handle connectors and cables with care, using the following guidelines.



CAUTION: Before performing any maintenance, disconnect fiber optic cables from the unit and turn off power.

- When disconnecting fiber optic cables, apply the included dust caps to the ends to maintain their integrity.
- Before connecting fiber optic cables, clean the connector tips and in-line connectors.
- Before attaching in-line connectors, clean them with moisture-free compressed air.
- Failure to perform these tasks may result in damage to the fiber optic connectors or cables.

Service Procedures

Contacting ETS-Lindgren



Note: Please see www.ets-lindgren.com for a list of ETS-Lindgren offices, including phone and email contact information.

Replacement and Optional Parts



Note: ETS-Lindgren may substitute a similar part or new part number with the same functionality for another part/part number. Contact ETS-Lindgren for questions about part numbers and ordering parts.

Part Number	Part Description
7007-001	EMSense Plug-in Card for Battery-Operated Probes
7007-002	EMSense Plug-in Card for Laser-Powered Probes

Sending a Component for Service

For the steps to return a system or system component to ETS-Lindgren for service, see the *Product Information Bulletin* included with your shipment.

Calibration Services and Annual Calibration

See the *Product Information Bulletin* included with your shipment for information on ETS-Lindgren calibration services.

Specifications



Note: For more specifications of the optional field probes, see the EMSense data sheet on the [ETS-Lindgren website](#) for more details.

Physical Specifications

Exterior Dimension:	1 slot
---------------------	--------

Environmental Specifications

Temperature Range:	0°C to 35°C (32°F to 95°F)
Relative Humidity:	10% to 90% (non-condensing)

Appendix A: Warranty



Note: See the *Product Information Bulletin* included with your shipment for information for the complete ETS-Lindgren warranty.

Scope and Duration of Warranties

Seller warrants to Buyer that the Products to be delivered hereunder will be (1) free from defects in material, manufacturing workmanship, and title, and (2) conform to the Seller's applicable product descriptions and specifications, if any, contained in or attached to Seller's quotation. If no product descriptions or specifications are contained in or attached to the quotation, Seller's applicable product descriptions and specifications in effect on the date of shipment shall apply. The criteria for all testing shall be Seller's applicable product specifications utilizing factory-specified calibration and test procedures and instruments.

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to three years.

Product Warranted	Duration of Warranty Period
Model 7007-001: EMSense™ EMF Probe Plug-in Card, Battery	3 Years
Model 7007-002: EMSense™ EMF Probe Plug-in Card, Laser	3 Years

Any product or part furnished to Buyer during the warranty period to correct a warranty failure shall be warranted to the extent of the unexpired term of the warranty applicable to the repaired or replaced product.

Warranty Exclusions

Except as set forth in any applicable patent indemnity, the foregoing warranties are exclusive and in lieu of all other warranties, whether written, oral, express, implied, or statutory. EXCEPT AS EXPRESSLY STATED ABOVE, SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, BY STATUTE OR OTHERWISE, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE OR OTHERWISE ON THE PRODUCTS, OR ON ANY PARTS OR LABOR FURNISHED DURING THE SALE, DELIVERY OR SERVICING OF THE PRODUCTS. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

Warranty coverage does not include any defect or performance deficiency (including failure to conform to product descriptions or specifications) which results, in whole or in part, from (1) negligent storage or handling of the product by Buyer, its employees, agents, or contractors, (2) failure of Buyer to prepare the site or provide an operating environmental condition in compliance with any applicable instructions or recommendations of Seller, (3) absence of any product, component, or accessory recommended by Seller but omitted at Buyer's direction, (4) any design, specification, or instruction furnished by Buyer, its employees, agents or contractors, (5) any alteration of the product by persons other than Seller, (6) combining Seller's product with any product furnished by others, (7) combining incompatible products of Seller, (8) interference with the radio frequency fields due to conditions or causes outside the product as furnished by Seller, (9) improper or extraordinary use of the product, or failure to comply with any applicable instructions or recommendations of Seller including maintenance, calibration and cleaning procedures and intervals, or (10) acts of God, acts of civil or military authority, fires, floods, strikes or other labor disturbances, war, riot, or any other causes beyond the reasonable control of Seller.

This warranty does not include (1) batteries, (2) cables, (3) gasket, (4) fingerstock, or any item that is designed to be consumable. Seller does not warranty products of others which are not included in Seller's published price lists.

Buyer's Remedies

If Seller determines that any product fails to meet any warranty during the applicable warranty period, Seller shall correct any such failure by either, at its option, repairing, adjusting, or replacing without charge to Buyer any defective or nonconforming product, or part or parts of the product. Seller shall have the option to furnish either new or exchange replacement parts or assemblies.

Warranty service shall be performed at the Seller's factory, or the Buyer's site at the sole discretion of the Seller. Within the warranty period, the Buyer shall be responsible for all transportation to the Seller's factory, and the Seller shall be responsible for transportation of goods to the Buyer's site.

Within the contiguous 48 United States, warranty service performed during the applicable warranty period will be performed without charge to Buyer during Seller's normal business hours. After the warranty period, service will be performed at Seller's prevailing service rates. Subject to the availability of personnel, after-hours service is available upon request at an additional charge.

Outside the contiguous 48 United States, travel and per diem expenses, when required, shall be the responsibility of the Buyer, or End User, whichever is applicable regardless of the warranty period.

The remedies set forth herein are conditioned upon Buyer promptly notifying Seller within the applicable warranty period of any defect or non-conformance and making the product available for correction.

The preceding paragraphs set forth Buyer's exclusive remedies and Seller's sole liability for claims based on failure of the products to meet any warranty, whether the claim is in contract, warranty, tort (including negligence and strict liability) or otherwise, and however instituted, and, upon the expiration of the applicable warranty period, all such liability shall terminate. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND ARISING OUT OF, OR AS A RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, ASSEMBLING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT DESPITE ANY NEGLIGENCE ON BEHALF OF THE SELLER. IN NO EVENT SHALL SELLER'S LIABILITIES UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCT IN RESPECT OF WHICH DAMAGES ARE CLAIMED. This agreement shall be construed in accordance with laws of the State of Texas. In the event that any provision hereof shall violate any applicable statute, ordinance, or rule of law, such provision shall be ineffective to the extent of such violation without invalidating any other provision hereof.

Any controversy or claim arising out of or relating to the sale, delivery, non-delivery, servicing, assembling, use or loss of use of the products or any part thereof or for any charges or expenses in connection therewith shall be settled in Austin, Texas by arbitration in accordance with the Rules of the American Arbitration Association, and judgment upon the award rendered by the Arbitrator may be entered in either the Federal District Court for the Western District of Texas or the State District Court in Austin, Texas, all of the parties hereto consenting to personal jurisdiction of the venue of such court and hereby waive the right to demand a jury trial under any of these actions.

Appendix B: EC Declaration on Conformity

ETS-Lindgren Inc. declares these products to be in conformity with the following standards, following the provisions of EMC-Directive 2004/108/EC:

Model 7007-001: EMSense™ EMF Probe Plug-in Card, Battery

Model 7007-002: EMSense™ EMF Probe Plug-in Card, Laser

Emission: EN 61326-1:2006, Class B
Electrical equipment for measurement, control, and laboratory use.

Immunity: EN 61326-1:2006, Industrial level, performance criteria A
Electrical equipment for measurement, control, and laboratory use.

Technical Construction Files are available upon request.