

SMART™ Chamber

(Statistical Mode Averaging Reverberation Test Site)

Installation, Operation, & Maintenance Manual



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An ESCO Technologies Company

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| A | Initial Release | March, 2004 |
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| C | Updated tuner <i>Installation Procedure</i> ; rebrand | July, 2008 |
| D | Added <i>EC Declaration of Conformity</i> | November, 2008 |
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| F | Updated software information | April, 2019 |

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Notes, Cautions, and Warnings

| | |
|---|--|
|  | Note: Denotes helpful information intended to provide tips for better use of the product. |
| CAUTION | Caution: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures. |
| WARNING | Warning: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures. |



See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

ETS-Lindgren Product Information Bulletin

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

- Warranty information
- 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

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1.0 Good Shielding Practices

To retain the RF shielding integrity of the chamber, follow these good shielding practices:

- Periodically clean and lubricate doors.
- When mounting screw-retaining items within the enclosure, do not penetrate through both shields of a modular panel system. Screws must not penetrate any portion of the screen system.
- Do not use framing screws to fasten items within the enclosure.
- When a hole is bored for a new penetration, remove all burrs. Clean the perimeter of the hole and the penetration with a cleaning agent before installing the new penetration.
- Nothing must penetrate the enclosure wall, floor, or ceiling without use of a proper ETS-Lindgren designated penetration.
- Bolts fitted to the modular and pan-type rooms must be fitted to correctly-sized holes, correctly de-burred, and cleaned.
- Use flat washers on both sides of the shield penetration.

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2.0 Maintenance

CAUTION

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

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

Optional Maintenance Program

ETS-Lindgren offers an optional maintenance program that consists of a complete package of services for continued RF integrity in the shielded enclosures. The services may be performed on a three-month or six-month cycle. The program consists of the following:

- **Inspection of doors and access panels.** Extreme care will be taken to repair, clean, and lubricate the RF seals (fingers and vinyl seals). If necessary, they will be replaced.
- **Inspection of hinges.** Hinges will be checked for alignment and adjusted as needed.
- **Inspection of door and access panel latching mechanisms.** Latching mechanism of doors and access panels will be inspected. Any defective or worn components which cannot be repaired will be replaced. Adjustment will be performed as needed. Extra material used to replace damaged parts due to abuse or failure to comply with recommended maintenance procedures will be charged to the customer.
- **Inspection of tuners.** Tuner operation will be checked, lubricated, and adjusted as necessary.

Tuners

The SMART™ (Statistical Mode Averaging Reverberation Test Site) chamber tuners are manufactured from rigid structure of gatorboard covered with copper sheet on the Z-fold section to provide the necessary reflective surface, or of an aluminum frame with aluminum reinforced sheet reflectors.

No maintenance of the box structure is required in normal use. However, the surfaces may be dusted or vacuumed periodically to maintain their appearance.

The tuners are supported at their ends only with coupling clamps. These should be inspected monthly for signs of wear, loose screws, or distortion.



The motors mounted external to the chamber are fixed to the chamber wall and additionally supported either on a separate frame or the chamber supports. The motor shaft passes into the chamber through a shielded penetration fitted to the chamber wall. The horizontal penetration also ensures that the axial load is not transmitted to the motor from the tuner.

The RF feed through bearing assembly on the motor side and a self-aligning (on large chambers) idler bearing on the non-driven end supports the horizontal tuner. The self-aligning bearing assemblies have a grease nipple that should be topped off every six months using standard bearing grease. They should also be checked periodically to ensure free movement and that fixings remain secure.

The tuner body needs only periodic cleaning to remove any accumulated dust. On all chambers the RF feed-through assembly on the motor side of the tuner contains a large number of ball bearings. These provide the RF shielding of the gear shaft as it passes through the shield and should not be removed.

On the SMART 1000 model the tuners are much smaller and subject to less wear. The tuners should be inspected every six months for signs of excessive noise or motor overheating. The tuners are lubricated at the factory, so additional lubrication should not be required.

CLEANING

CAUTION

Removal of the tuner assembly must be performed by qualified ETS-Lindgren personnel.

- Remove excess dust from the tuner and bearing assembly with a dry cloth or vacuum.
- Check the fixings to the shielded room and the tuner assemblies.

Doors

Periodically clean the brass or steel door frame and beryllium copper finger stock with Channel Master® 9101 lubricant. See the decal applied to the door for more detailed instructions. If staining or corrosion is present on the brass frame or finger stock, polish lightly with 3M Scotch-Brite® pads. If extreme staining or corrosion persists, call ETS-Lindgren for assistance.

Periodically inspect the roller cams and cam blocks to verify that a thin film of lubricant is present. If additional lubricant is required, apply a very thin film of silicone grease. The door maintenance kit included with each door contains the necessary lubricants, cleaning material, and replacement finger stock.

CAUTION

Do not polish the brass or beryllium copper finger stock with steel wool, electric sanders, wire brushes, medium or fine sandpaper, or any abrasive materials or devices other than those specified in *Maintenance* on page 40.

Do not polish any of the brass striking surfaces with any type of brass polish.

Do not apply a floor wax to the door sill of door types D and E (flush sills). Use caution when waxing the floors inside and outside the enclosure to make sure that wax is not applied to the flush door saddle.

Do not apply wax to the metal surfaces of the chamber.

Do not attempt to oil hinges or door handles. They are permanently lubricated.

MONTHLY MAINTENANCE

To catch excess fluids, place absorbent material (cloth, sponge, and so on) beneath the entire length of the door sill prior to cleaning and lubricating. Do not wipe finger stock.



Perform proper cleaning and lubrication of the contact finger mechanism every month.

Use the cleaning agent Channel Master 9101; lubricate only in accordance with the manufacturer instructions.

1. Use a generous amount of the cleaning agent to flush the entire finger recess on the door frame. Start across the top of the door frame and work down both sides. Flush bottom last. This process will wash off all visible residues on fingers.
2. Wipe brass door frame with a clean cloth.

3. Inspect finger stock; install new finger stock where necessary.
4. Wipe knob edge on door leaf with a clean cloth wetted with cleaning agent.

ANNUAL MAINTENANCE

1. Perform maintenance as described in *Monthly Maintenance* (see previous section).
2. During inspection of finger stock, count the number of patches that have been replaced. If more than five patches have been replaced, remove all finger stock (part# 81D-6L) and vinyl seal shield (part# VS-100) from the channel. Install new finger stock and new seal.
3. Lubricate tuner bearing grease nipples using standard bearing grease.
4. Check motor supply and signal cable condition external to the chamber.
5. Remove excess dust from motor (and amplifier, if fitted).

REPLACING FINGER STOCK AND VINYL SEAL

1. Remove old finger stock and vinyl seal using needle-nose pliers.
2. Clean channel.



Use the cleaning agent as described in the manufacturer instructions.

3. Cut exact lengths of finger stock for each of the four sides of the frame.
4. Cut exact length of vinyl seal.
5. Starting in upper left corner, install first row of finger stock down the entire side of the frame.
6. Lubricate fingers and channel again.
7. Again starting in the upper left corner, insert second row of finger stock down the entire side of the frame. Fingers should be gently pressed into position one at a time until they are locked in place.
8. Repeat steps 5, 6, and 7 for each of the remaining three sides of the frame.

9. Re-lubricate all finger stock and channel.
10. Beginning in the middle of the side of the frame, start installing the vinyl seal by inserting it by hand into the channel opening. Go around the door frame so that the vinyl seal covers the finger stock completely.
11. Using the right angle corner of a rectangular piece of sheet metal (about 4 in x 8 in x 16 ga.) or a wide putty knife, gently push the vinyl seal between the two rows of finger stock to the final position at the base of the channel. Use caution at the corners to insert the vinyl seal behind one finger at a time.
12. If fingers are broken during insertion of the vinyl seal, a patch section must be inserted.

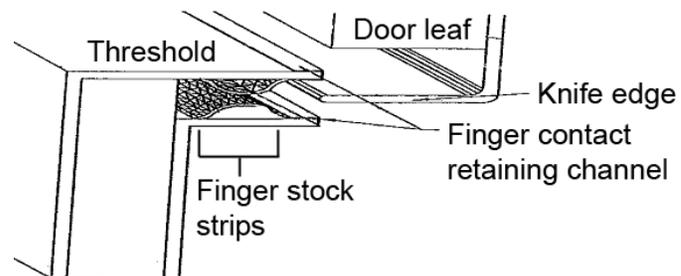
FINGER STOCK REPAIR

For All Doors

You can replace recessed finger stock without removing the door. Finger stock 81D-6L can be replaced in sections if a maximum of 10 inches is damaged.

1. Remove broken or loose pieces with needle-nose pliers.
2. Select an overlapping piece not less than four inches longer than the missing section and insert new finger stock.

For Door Type D and Type E



Steel Door Recessed Finger Stock

1. Follow the finger stock repair instructions in *For All Doors* (see previous section) for door types D and E.

The flush sill requires the following additional instructions.

2. **Type D door**—Remove all screws at the bottom edge of the type D door that permit removal of the finger stock angle.

Finger stock is soldered onto this removable brass angle at the bottom of the door. As with replacement of recessed fingers, it is not necessary to remove the door to replace the finger stock at the sill.

Use a sharp instrument (such as a penknife) to remove the section of broken fingers.

Install new finger stock 81D-6L by overlapping one finger at each end of old finger stock; solder the perforated area of a new finger to the brass plate.

Make sure that the solder does not flow to the fingers; this anneals the temper of the fingers and will cause them to break during use.

3. **Type E door**—The type E double flat sill door uses a different finger support arrangement. The 16-in finger strips are retained by an aluminum strip that must be removed to access the fingers. A removable steel strip retains the fingers on the center carrier. Additional parts are included in the Steel Door Maintenance Kit, part# UM144.

Service Procedures

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

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3.0 Tuners

General Precautions

WARNING

Do not stand beneath the horizontal tuner or in the path of the vertical tuner while they are under remote control or moving. It is recommended that a warning indication or barrier be placed in the chamber to reduce the risk of damage or injury during operation.

Do not use abrasives on the tuner assembly. Clean only with vacuum or by dusting.

The tuners must never be turned manually by pushing the tuners (except SMART 1000 tuners). This could result in damage to the support shaft or motor/gear box assembly.

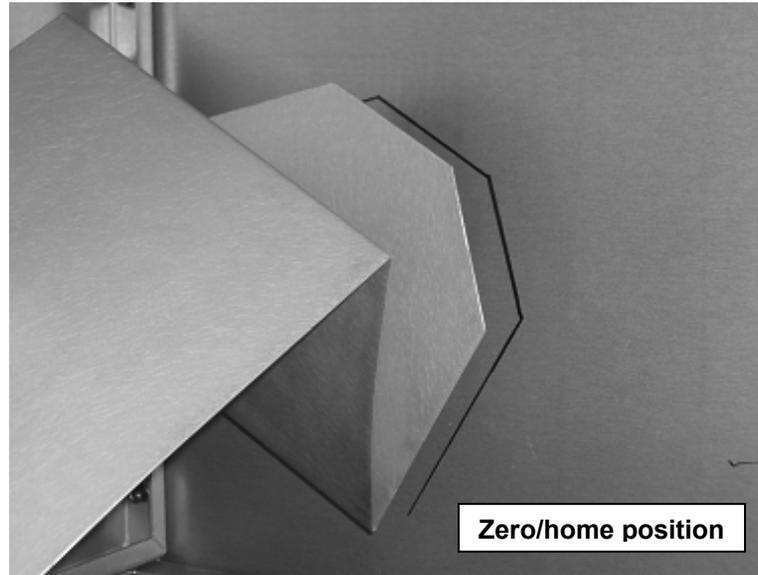
Do not fit any additional loads to the tuner assemblies. The motor acceleration and deceleration profiles have been set to account for the inertia of the tuners; changing the loads could overstress the couplings or gear box assembly. Manually running the tuners at speeds in excess of the preset limits could also result in damage and should not be performed.

Do not cover any surface of the tuners. This could affect the performance of the chamber.

For the SMART 1000 tuners, the zero or home position is indicated with a mark in the chamber; see the following illustration.



See *Maintenance* on page 9 for information on recommended tuner maintenance and cleaning.



Installation Procedure for SMART 200 and Larger Chambers

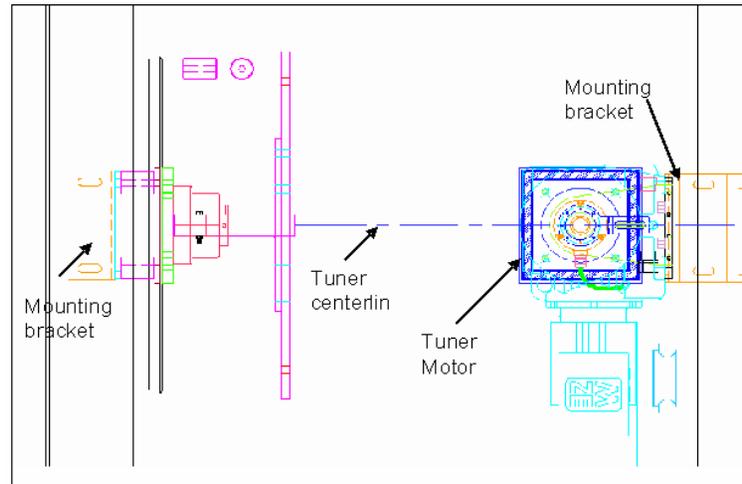
CAUTION

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

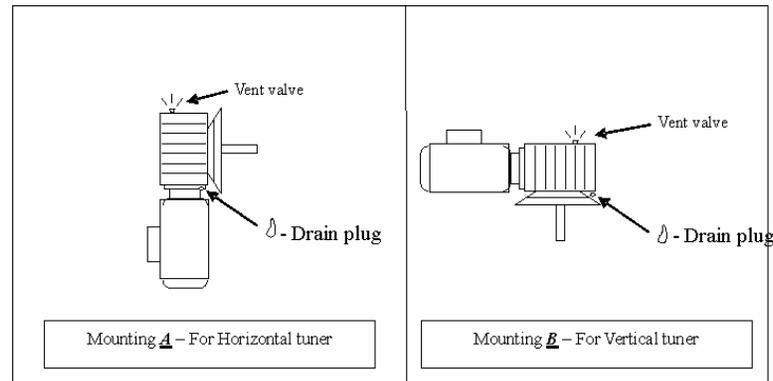
Tuner installation steps are provided for both the S81 sandwich-type and pan-type shields. The installation is similar with differences in the mounting bracket assembly. The tuners may be installed during or after the completion of the chamber installation. Access will be required on both the inner and outer sides of the wall panels for the installation of the horizontal tuner.



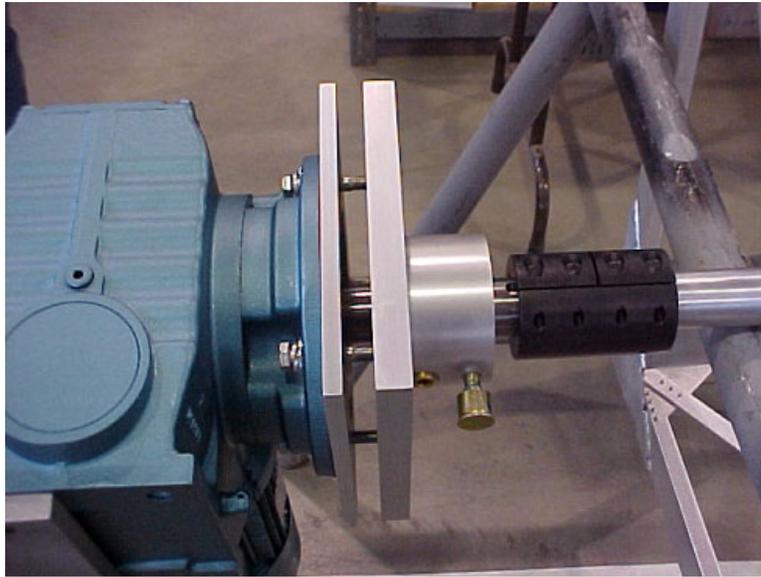
Review the entire installation procedure before beginning.



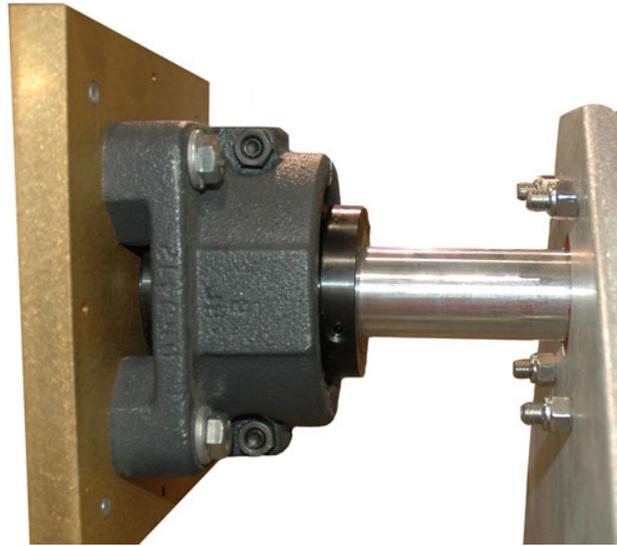
1. Determine the orientation of the motor, and then place the motor on a clear surface to check plug locations. Locate the oil plug behind the mounting flange. Locate the vent and drain plugs and verify that they are positioned so that the vent and filler plugs are uppermost on the gear box with the drain at the lowest position. If necessary, move to another position on the gear box.
2. Mark the location on the chamber wall where the tuner motor is to be mounted. Using the mounting plates as a template, mark the motor and fixing holes in the shield.



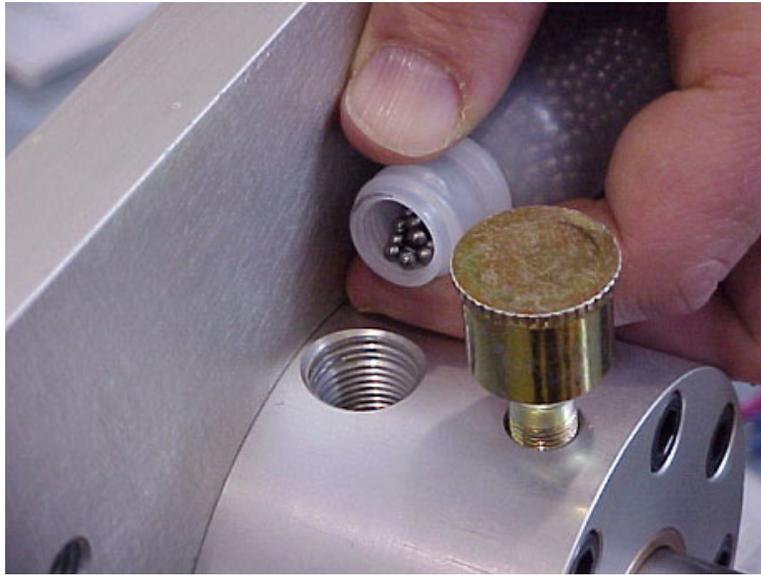
3. Verify that the idler mounting plate can be mounted at the opposite end without obstruction, and that the motor(s) can be mounted in horizontal or vertical orientation without obstruction, and with suitable fixing.
4. Cut the holes in the panel as required for the shaft and the four mounting screws.



5. Mount the motor and fix securely to the chamber wall with the outer plate, inner plate, and bearing cup.
 - Using an axial laser level, locate and mark the position for the tuner idler bearing on the opposite wall. This must be directly aligned with the motor shaft.



- Mount bearing inner and outer plate.
- Using a lift, raise the tuner into position and align the shaft ends. Fix the couplers without the key to the motor shaft end and bearing end if a separate shaft is used. Alternatively, insert the tuner end shaft into the idler bearing and secure with the fixing (set/grub) screws.
- For the vertical tuner, locate the tuner shaft in the ceiling clamp to temporarily support the weight of the tuner.
- Locate and fix the idler bearing to the floor using wood screws supplied for modular panels (S81) or bolts to the inner floor of the pan-type room.
- Secure the tuner shaft in the idler bearing with at least 1/2-in (12-mm) gap between the shaft and chamber surface. Secure the set screw so that tuner weight can be taken by the bearing.
- Release the motor coupling and insert the key into the keyway. Tighten coupling.



- Fill the bearing housing with the supplied shot.



- Remove grease cap next to shot filler hole and fill with the conductive grease supplied, then replace. Do not overfill to the point where excessive grease is visible on the shaft.
 - Mount the motor control panel in a convenient position on the outer wall of the chamber, within easy reach for operation of the emergency stop.
 - Route and secure cables and fibers as necessary to the motor controller and power supply.
 - Check installation before powering on. Confirm that the bearing housing cap is secure and check all fixings.
 - Rotate tuner using the controller and verify free operation.
6. For the pan-type chamber, mark the location of the motor angle bracket. Fix the motor to the bracket and the bracket to the chamber support so that the motor plate is perpendicular to the shield wall. The motor should be supported by the chamber support structure.

ELECTRICAL

The tuner motor is connected to the control unit at the factory and supplied with a length of conduit appropriate to the chamber. The control unit should be mounted on the wall of the chamber within easy reach to operate the emergency switch.

Each tuner motor is a three-phase unit with a variable speed drive control. Each motor uses less than eight amps under normal load.

The unit should be connected to a protected 208–230 volt, 15A supply, with the wires connected as follows:

Brown: Phase 1

Blue: Phase 2

Green / Yellow: Earth

For chambers with two tuners, the motor controllers can be connected to a single 20-amp supply.

VERTICAL TUNER INSTALLATION

1. Install the motor end of the tuner as described in the installation procedures beginning on page 18.
2. Using on the inner mounting plate, mount the idler bearing as described in the installation procedures beginning on page 18.
3. Fix the plate to the inner shield surface using adhesive or wood screws penetrating only the inner surface of the panel.

Tuner Control – SMART 1000

The SMART™ (Statistical Mode Averaging Reverberation Test Site) 1000 chambers are fitted with a dedicated motor drive control unit mounted onto the back of the chamber. This unit controls the motors for both the vertical and horizontal tuners. The motors are linked to 10:1 gear box and use half-stepping, providing 400 steps per revolution. The motor controller is set so that the required angular position of the motor is defined by $\theta/4.5$, which means that the angular position used in the seek command must be divided by 4.5.

The current position (CP) read from the controller returns the corrected value.

The tuners can be operated in either a stepped (tuned) mode with step size from two-degree increments, or a stirred mode with one of three available speed settings using the **Sx** command. The stepper motors can provide position feedback while switched on and when queried will reply with the current tuner position relative to the zero position set at switch on.

Stored tuner positions do not exist; therefore, the tuners default to a setting of zero degrees when powered on, regardless of actual position. The home position for the tuners should always be set prior to performing measurements using the indications provided on the inside of the chamber. This also represents the home position used for the factory calibration.

Communication is through an RS-232 interface. Two ports are required for the two tuners. Following are the required computer settings.

RS-232 PORT SETTINGS

Baud Rate: 9600

Bits: 8

Parity: None

Stop Bit: One

Flow Control: None

OPERATION

The antennas fitted to the SMART 1000 can be used for either transmit or receive depending if the chamber is being used for immunity or emission measurements. In either case, calibration data can be used to provide corrections for the measured quantities.

SMART 1000 chambers are provided either with two antennas covering the entire frequency range of 1 to 40 GHz or with two identical antennas from 1 to 18 GHz (one transmit and one receive). The chamber is calibrated at the factory and supplied with the chamber calibration factors based on the IEC61000-4-21 method.

COMMAND SYNTAX

Use a program that allows direct communication with the COM ports to verify satisfactory operation of the tuners; for example, ETS-Lindgren *TILE! software*.

| Command | Parameters | Function | Example |
|---------|-------------------|-------------------------|---------|
| Sx | 0/1/2/3/ ? | Set tuner speed/Query | S1 |
| CR | NA | Continuous rotation | |
| NCR | NA | Non-continuous rotation | |
| ST | NA | Stop | |
| CPnnn.n | 000.0-999.9/ ? | Current Position/Query | CP180.0 |
| CC | NA | Move CCW | |
| CW | NA | Move CW | |
| ULnnn.n | 000.0 – 999.9 / ? | Set CW Limit/Query | UL360.0 |
| LLnnn.n | 000.0 – 999.9 / ? | Set CCW Limit/Query | LL000.0 |
| DIR? | NA | Query Direction | |
| SKnn.n* | nn.n – 80* | Seek Position | SK75 |

* Angle required divided by 4.5; for example, $300/4.5 = 75$

Tuner Control – SMART 80 and SMART 200

The SMART 80, SMART 200, and other large chambers are operated using the ETS-Lindgren 125241 - ASSY,EMCENTER CONTROLLER, 2-SLOT+GPIB (or next generation ETS-Lindgren controller, if applicable). The command set for the controller is described in detail in the controller manual. Go to ets-lindgren.com to download the controller manual.

Operation of all SMART chambers is described in detail in the *TILE!* manuals. These programs are used to control the chamber and contain the necessary drivers for all available tuner control options.

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4.0 Shielding

CAUTION

The RF shield must be installed by or the installation supervised by a qualified individual.

Series 81 Modular Shielding

TYPE: Modular Systems—Series 81 (28 ga. steel)

DESCRIPTION: Two layers of sheet steel laminated to a wood core. Modular panels joined with 11 ga. ETS-Lindgren framing system using 1/4 in screws on 4-in centers.

OPERATION:

After the enclosure is installed, the interior finishes should not be changed. It is important that:

1. Liquids are not spilled on the shielding.
2. Only ETS-Lindgren RF penetration be used through the walls, floors, and ceiling.
3. Framing screws are not used to secure any item to the wall.
4. All screws are tightened to 90-in lb torque. If screws are removed, they must be reinstalled with the use of a calibrated torque wrench or screw gun.

Pan-Type Shielding

TYPE: Pan-Type Systems—Euroshield (18 ga. steel or aluminum)

DESCRIPTION: One layer of sheet steel or aluminum, joined with M8 screws and double-row gasket in all mating joints.

OPERATION:

After the enclosure has been installed, the interior finishes should not be changed. It is important that:

1. Liquids are not spilled on the shielding.
2. Only ETS-Lindgren RF penetration be used through the walls, floors, and ceiling.
3. All screws are tightened to 90-in lb torque. If screws are removed, they must be reinstalled with the use of a calibrated torque wrench or screw gun.
4. Suspended floors are earthed with bonded contact to the shield walls. Changing this bonding could affect the chamber performance.

5.0 Power Line Filters

An electrician generally installs power line filters at the time of the enclosure installation. After the filters are put into service, they rarely require maintenance. Should a problem occur, only a qualified electrician should troubleshoot the problem.

WARNING

Most power line filters have a built-in voltage discharge system. However, it is possible for the discharge system to be inoperative in certain conditions; therefore, all filters must be discharged prior to being handled. To discharge filters a resistance greater than 100,000 ohms must be used in the discharge probe.

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6.0 Vents

Honeycomb vents are used for the ventilation system of the enclosure and normally do not require maintenance. The honeycomb vents work as a waveguide beyond cut-off and are sized depending on the upper frequency of operation of the chamber. High frequency rooms, therefore, use small bore vents. Conductors of any kind must not be passed through the vents or the performance of the vent will be drastically reduced.

Should the accumulation of lint or dust require that the honeycomb be cleaned, the duct system on both sides of the honeycomb must be opened so that the honeycomb vent may be vacuum-cleaned from both sides. The duct system should then be reinstalled per the original construction.

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7.0 Penetrations

Penetrations must be provided for any services which pass through the walls, floor, or ceiling of the enclosure. These penetrations are normally put in place at the time the enclosure is installed and rarely require maintenance.

Exceptions are for active penetrations such as cable feed-throughs, tuner penetrations, and coaxial fittings, which must be re-tightened occasionally.

Installation of a new penetration can be performed by the customer but must be done in accordance with ETS-Lindgren shielding practices. For more information, see *Good Shielding Practices* on page 7.

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8.0 Doors

ETS-Lindgren manufactures RF shielding doors. Doors are one of the most active and, therefore, the most vulnerable components of any reverb chamber. The instructions in this section must be followed to retain the RF integrity of the enclosure.

General Precautions

CAUTION

Do not slam the door to start engaging the fingers. This is not necessary with the ETS-Lindgren latching mechanism and could result in damage to the latch roller assembly.

Do not shove or kick the door when opening. The contact finger pressure release is performed entirely by the ETS-Lindgren latching mechanism.

Do not attempt to close the door with the handle rotated in the full stop or closed position. This may break off the latching roller pins.

Do not exert excess pressure on the door handle. A nominal force of 25 lb is all that is required until full stop or full open positions are reached. Excessive forces could result in broken latch pins.

If the closing or opening forces become excessive, the door should be serviced.



See *Maintenance* on page 9 for information on recommended door maintenance, including steps to replace and repair finger stock.

Door Types

- Type A—RCM Light Weight
- Type B—RCM Single
- Type C—RCM Double
- Type D—RCM Flush Sill, Single
- Type E—RCM Flush Sill, Double
- Type F—RCM Access Panel
- Type G—Sliding Doors, Manual and Automatic

Door Operation for Types A, B, C, D, E, and F

In the operation of the door, the ETS-Lindgren cam-actuated latching mechanism brings the door to a completely closed condition with the handle rotated to the full stop position. Conversely, when the handle is rotated in the opposite direction to the alternate position, the door knife edge is removed from the finger contacts, allowing the door to fully open. In this position the door will swing freely with little opposition.

When closing the door, normal door pressure should be applied until the cam actuators are engaged in the cam blocks. At this point no further inward pressure on the door is required. Rotate the door handle until the handle has reached the full stop position. The cam action of the door latching mechanism provides all the pressure required to separate and correctly contact the fingers.

On large double-leaf swing doors, the surface area of the contact fingers is larger so the latching effort required is slightly greater. At no time should more than hand pressure be required or applied to the latch mechanism.

Flush sill doors have a double or triple row of contact fingers fitted to the bottom edge. These are exposed and should be checked periodically for damage.

TYPE A DOOR LATCH



ETS-LINDGREN
EMERGENCY RELEASE DOOR
Manufactured in Danbury, CT, U.S.A.

The door is a precision product designed to meet specific frequency and electromagnetic radiation. These doors are carefully selected at the factory for optimal performance but require regular maintenance to ensure maximum performance in order to maintain the original level of shielding.

Please do not attempt to perform maintenance without a fully trained technician.

The maintenance manual located in the door is for your reference only.

Additional kits are available.

For more information contact:
ETS-LINDGREN
400 Lindgren Drive
Danbury, CT 06810
Phone: 1.800.557.2222
www.etslindgren.com

04-001-1012

TYPE B DOOR LATCH



Door Operation for Type G

This door is most often installed on large chambers for large equipment access. Operating and maintenance instructions differ quite significantly from the standard swing doors; therefore, individual operation and maintenance manuals are issued with each door fitted to a chamber.

Adjusting RCM 1 Hinges

Adjustment is the same for left and right hinges. All hinges must be aligned together.

UP-AND-DOWN ADJUSTMENT

1. Open the door.
2. Place a hex key in the top of the hinge pin.
3. Turn the hinge pin clockwise to move the door leaf up; turn the hinge pin counterclockwise to move the door down. Approximately three to four turns are typically required to set the correct spacing between door and the jamb; for example, 1/8 in (3 mm) to 5/32 in (4 mm).
4. Close the door.
5. Repeat as required.

SIDE-TO-SIDE ADJUSTMENT

1. Adjust each hinge as required to move either the top or bottom of the door leaf.
2. Close the door. Do not loosen the dome head nuts on the frame side of the hinge.
3. Loosen the M5 x 10 mm grub screw on the side of the hinge fitted to the door leaf.
4. Loosen the three dome nuts on the hinge (3/8-in diameter).
5. Move the door leaf to set the correct spacing between door and the jamb. Tighten dome nuts and torque to 12 ft lb.

6. Insert and tighten the grub screw until it touches the middle bolt of the hinge to stop the door from moving.
7. Open and close the door. Check the spacing at the door and jam. Adjust as required.
8. Tighten all bolts to correct torque setting.

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Appendix A: Warranty



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

DURATION OF WARRANTIES

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to the warranty period indicated in the following table.

| Product Warranted | Duration of Warranty Period |
|----------------------------------|-----------------------------|
| Anechoic Chamber Performance | 5 Years |
| Antennas | 2 Years |
| Positioning Equipment | 2 Years |
| Field Probes | 3 Years |
| Doors & Accessories | 1 Year |
| Filters | 1 Year |
| Telescoping Sprinkler Assemblies | 1 Year |
| Custom Equipment | 1 Year |
| Cables & Connectors | 1 Year |
| CCTV | 2 Years |

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Appendix B: EC Declaration of Conformity



Declaration of Conformity

We, ETS-Lindgren, L.P., 1301 Arrow Point Drive, Cedar Park, TX, 78613, USA, declare under sole responsibility that the:

Model/Part Number: SMART 700/800/1000

Model/Part Name: SMART Reverberation Chamber

Date of Declaration: 17 September, 2008

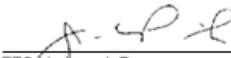
to which this declaration relates, meets the requirements and is in conformity with the relevant EC Directives listed below using the relevant section(s) of the following EC harmonized standards and other normative documents;

Applicable Directive(s):

Low Voltage Directive (LVD), 73/23/EEC and its amending directives

Applicable harmonized standard(s) and/or normative document(s):

EN 61010-1:1993 Safety requirements for electrical equipment for measurement, control, and laboratory use



ETS-Lindgren L.P.
James C. Psencik, Vice President of Engineering

The authorizing signatures on this Declaration of Conformity document authorizes ETS-Lindgren, L.P. to affix the CE mark to the indicated product. CE marks placed on these products will be distinct and visible. Other marks or inscriptions liable to be mistaken with the CE mark will not be affixed to these products.

ETS-Lindgren, L.P. has ensured that technical documentation shall remain available on premises for inspection and validation purposes for a period ending at least 10 years after the last product has been manufactured.