



RAYMOND EMC ENCLOSURES
QUIETSHIELD
OPERATION AND MAINTENANCE
MANUAL

JUNE 2006



TABLE OF CONTENTS

1. DESCRIPTION OF RAYMOND EMC QUIETSHIELD	3
1.1. PANELS AND FRAMING	3
1.2. DOORS.....	3
1.3. PENETRATIONS.....	3
2. QUIETDOOR OPERATING INSTRUCTIONS	3
3. QUIETSHIELD INSPECTION AND MAINTENANCE	4
4. QUIETDOOR MAINTENANCE	5
4.1. DAILY.....	5
4.2. WEEKLY.....	5
4.3. MONTHLY (or every 5,000 cycles).....	5
4.4. HOW TO ADJUST THE QUIETDOOR	6
4.5. HOW TO CLEAN THE QUIETDOOR FRAME AND FINGERSTOCK	6
4.6. HOW TO REPAIR FINGERSTOCK:	7
5. HONEYCOMB WAVEGUIDE VENTS	7
6. PENETRATIONS	8
7. RF FACILITY (POWER) FILTERS	8
8. PERFORMING A GROUND ISOLATION CHECK	10
9. SERVICE CALLS	11
10. MAINTENANCE MATERIALS	11



1. DESCRIPTION OF RAYMOND EMC QUIETSHIELD

1.1. PANELS AND FRAMING

The basic enclosure consists of a modular arrangement of RF Structural panels faced with galvanized sheet steel. Steel surfaces of the panels are treated to resist corrosion without degrading electrical continuity for RF attenuation. Framing members provide a clamping action of panel edges with uniform and consistent pressure. Framing members consist of 11 Ga. steel, zinc plated to resist corrosion without degrading electrical continuity of the joint. Trihedral corners are framed with brass machined cast corner cap assemblies consisting of inner and outer parts. Pre welded corner intersection are not utilized. The fasteners are cadmium plated, spaced 4" on centre. All fasteners are heat treated with minimum tensile strength of 135,000 psi. The door units are factory assembled, consisting of door leaf, doorframe, threshold, hardware and electrical contact strips.

1.2. DOORS

Door hardware consists of the following: two thrust and radial bearing hinges with provisions to position the door in its frame to the tolerance of 0.005" in both the vertical and horizontal directions. The latching device consists of cam actuated type latch and is operable from both sides of the door. The door is fitted with permanently lubricated bearings at all points of rotation. Contact with the strike is by a cam roller bearing. With the door leaf at rest and the fingerstock in light contact, the mechanism brings the door into its final closing RFI tight position.

1.3. PENETRATIONS

Waveguide type pipe penetrations are provided for all piping which penetrates the RF shielding. All incoming electrical conductors are provided with UL listed radio frequency filter. The filter conductors penetrate the enclosure through waveguide penetrations, which are an integral part of the filter. Supply and return ventilation is filtered through Honeycomb Waveguide vents.

Power filters are designed to attenuate RF energy on the incoming power by 100 dB from 14 KHz to 10 GHz (when tested per MIL STD 220A).

2. QUIETDOOR OPERATING INSTRUCTIONS

The doors are the most active and therefore the most vulnerable components of any RF shielded enclosure. Consequently, it is important



that the following instructions are diligently followed in order to retain the RF integrity of the enclosure.

To open a standard, manually operated door, pull up on the door handle until it reaches the fully unlatched position. The door will be sufficiently ajar to free all fingerstock from contact and pressure. In this position the door will swing freely with little opposition.

To close the QuietDoor, ensure that the handle is in the fully unlatched / up position. Normal force should be applied to the leaf until the guide slots on the latch blocks engage the cam rollers mounted on the doorframe. At this point no further inward force on the door is required. Push the door handle downward until it reaches the fully latched position. The cam action of the door latching mechanism will provide the force required to compress the fingers in their proper positions. The door should now be fully closed.

CAUTION:

DO NOT attempt to open or close the door with the handle in any position other than fully "open". To do so may damage the latching roller pins.

DO NOT exert excess pressure on the door handle. A nominal force of 45 N (10 lb) is all that is required until the fully latched or unlatched positions are reached.

DO NOT slam the door in order to engage the fingers. The latching mechanism will close the door properly.

3. QUIETSHIELD INSPECTION AND MAINTENANCE

The following guidelines must be observed in order to maintain the RF shielding integrity of the enclosure.

1. The QuietDoor must be periodically cleaned. See the section on "QuietDoor Maintenance".
2. Inspect all filters, penetrations, and honeycomb vents for signs of damage or corrosion.
3. If moisture exists, dry the affected area and take steps to remove the source of the moisture. Clean any corrosion that may exist. Record any problems and any remedial actions.
4. Water or high humidity degrades shielding performance. Wipe up any water spills on the shield as quickly as possible. A ground isolation



check is recommended after any major water spills, see “Performing a Ground Isolation Check” below.

5. Wherever possible, inspect all components of the QuietShield. If a puncture has occurred in a metal panel, solder with a 60-40 solid wire solder. If the puncture is too large to solder, call Raymond EMC for assistance.
6. Nothing may penetrate any part of the enclosure without the use of a Raymond EMC approved penetration.
7. If a hole is made for a new penetration, all burrs must be removed and both the perimeter of the hole and the penetration must be cleaned with a recommended cleaning agent before installation of the new penetration.
8. If any new work has occurred on or near the shielded enclosure, inspect the shield for damage, open holes or penetrations, or any new work. Take the proper action to restore the integrity of the enclosure. Record the nature of the problem and any remedial actions.

4. QUIETDOOR MAINTENANCE

4.1. DAILY

Clean the brass doorsill and all four (4) knife edges of the door with a clean cloth that has been dampened with a cleaning agent/lubricant such as methyl hydrate or microcare. Check for broken fingerstock. See “Maintenance Materials” below for a list of recommended supplies.

4.2. WEEKLY

Inspect the latching roller pin assembly, and re-tighten as necessary. If lubrication is required, apply a thin film of white lithium grease.

4.3. MONTHLY (or every 5,000 cycles)

Clean the brass doorframe and beryllium copper fingerstock, as outlined below. In the event of excessive stains or tarnish on the brass frame polish with 3M Scotchbrite pads. If extreme stains or corrosion persist, call Raymond EMC for assistance.

Daily and weekly maintenance requirements are dependent on door use. The procedures recommended here are based on extreme traffic conditions; in a typical environment the daily and weekly schedules may be combined and performed monthly.



4.4. HOW TO ADJUST THE QUIETDOOR

While the door is closed, examine the spacing between the door edge and the frame. Spacing should be uniform around all four sides of the door, at 1/8" ($\pm 1/32$ ") If the door leaf requires alignment within the frame, loosen the setscrews and door leaf hinge bolts. Place eight (8) 1/8" shim spacers between door leaf and frame. Tighten door leaf hinge bolts to 140 in. lb. of torque and tighten set-screws to come in contact with hinge bolts. Adjust the hinge pins until the desired height is achieved. Removal of shims leaves door and frame properly aligned. See Figure 1, Door Adjustment Detail below:

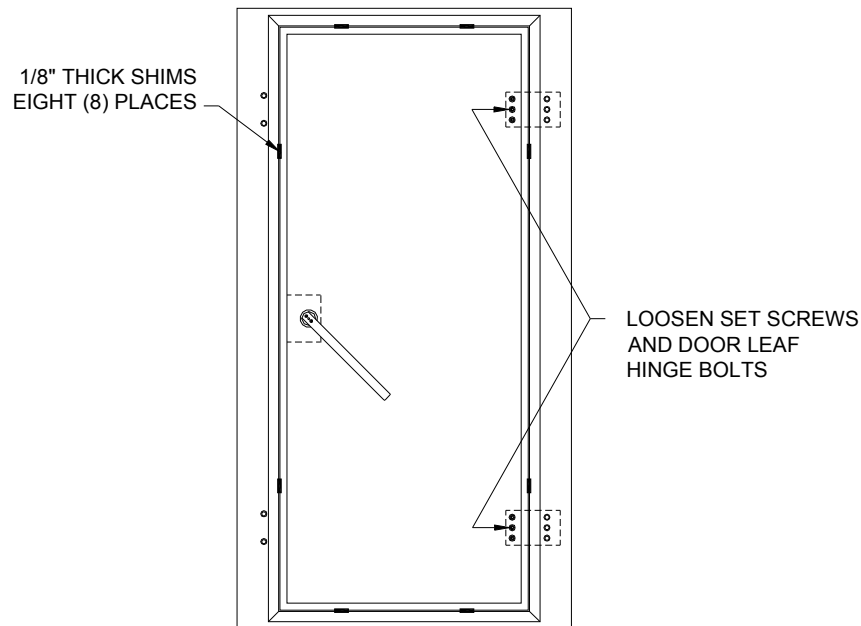


Figure 1- QuietDoor Adjustment Detail

4.5. HOW TO CLEAN THE QUIETDOOR FRAME AND FINGERSTOCK

1. Place an absorbent material (such as a drop cloth) below the entire length of the sill prior to cleaning and lubricating, to catch excess fluids. Do not wipe fingerstock.
2. Utilize the cleaning agent/lubricant (Methyl Hydrate or Microcare) only in accordance with the manufacturer's instructions.
3. Wrap a clean cloth around the blade of a putty knife (or a similar tool), and gently insert between the rows of fingerstock. Slowly wipe the fingerstock, being careful not to break any of



the fingers. Change cloth if necessary, and repeat this step until the cloth remains clean.

4. Repeat this procedure for both sides, and clean the bottom recess last. This process should clean off all visible residues on fingers. Any tarnished sections must be scrubbed clean with a 3M green Scotchbrite pad.
5. Wipe the brass doorframe with clean cloth. Wipe the knife-edges on the door leaf with a clean cloth that has been wetted with the cleaning agent.
6. Wet a clean cloth with the Target conductive silicon lubricant and wipe the clean knife edge.
7. Inspect fingerstock for broken or missing pieces. If fingerstock needs repair, follow the procedure outlined in the section “How To Repair Fingerstock”.

4.6. HOW TO REPAIR FINGERSTOCK:

1. With the door in the fully open position, remove broken or loose pieces with needle-nose pliers. If the damaged area is on the doorsill, remove the sill cover plate.
2. Remove the 18” strip of fingerstock, which contains the broken piece(s). A 2” putty knife or similar tool can be used to remove the strip from the doorframe.
3. Clean the brass doorframe with a Scotchbrite pad and wipe clean with a dry lint free rag.
4. Snap in a new strip of fingerstock. Ensure that the fingers are fully seated in place.

5. HONEYCOMB WAVEGUIDE VENTS

Honeycomb vents are used for the ventilation system of the enclosure and normally do not require maintenance. However vents should be closely inspected annually for signs of corrosion, build up of dirt or for damage. Should an accumulation of lint or dust occur, the honeycomb may simply be vacuum-cleaned. Any connecting duct-work that requires removal to gain access to the honeycomb should be re-installed as per the original construction. Should the vent be corroded or damaged, contact Raymond EMC and make arrangements for a qualified shielding technician to make repairs.



6. PENETRATIONS

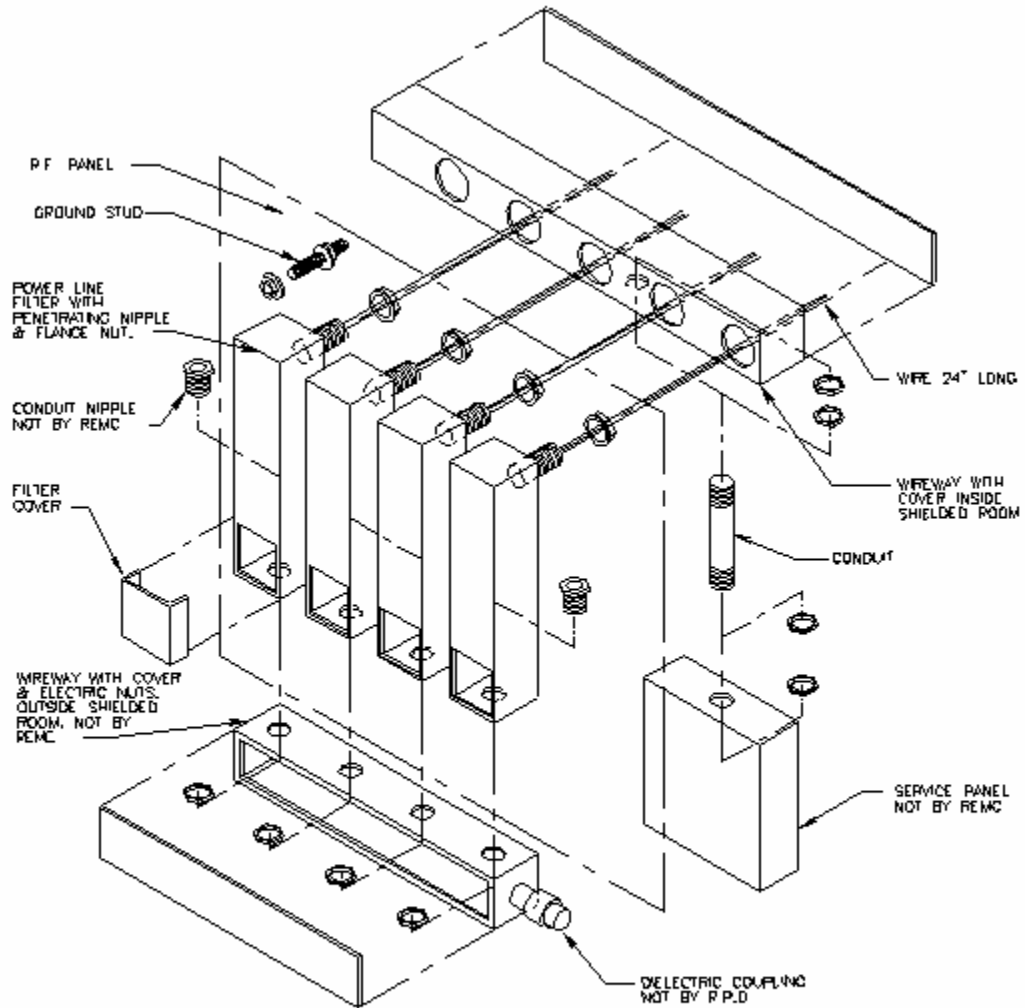
Feedthrough penetrations are provided for all services that pass through the shielded enclosure. Penetrations are installed during enclosure construction and normally do not require any maintenance. Exceptions are for active penetrations such as cable pass-throughs and coaxial fittings, which must be re-tightened as required. Installation of a new penetration may be performed by the customer, but must be done in accordance with Raymond EMC's shielding practice.

7. RF FACILITY (POWER) FILTERS

A qualified RF Technician or electrician normally installs filters during enclosure construction. Once in service they do not need any maintenance. Should problems occur, however, only a qualified RF Technician or electrician should work on the filters.

To Replace an RF Filter:

1. Review Diagram 5 "Filter Arrangement", below:



NOTE RAYMOND EMC PROVIDES FILTER UNITS WITH FLANGE NUTS. THIS DATA SHEET SHOWS A SUGGESTED METHOD FOR INSTALLATION

Figure 2- Exploded View of Facility (Power) Filters

2. Disconnect the power to the filter or filter bank at the breaker panel.
3. Open the access panel on the face of the filter.
4. **ALL FILTERS MUST BE DISCHARGED PRIOR TO BEING HANDLED.** Discharge the filter(s) with a discharge probe which has a resistance greater than 100,000 ohms. 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.
5. Remove the conductor(s)



6. Remove any wireway(s)
7. Unscrew the brass lock nut and remove the filter
8. Clean the brass lock nut and the shielding panel with a scotch bright pad
9. Install a replacement filter and tighten the locknut
10. Reattach the wireway(s) and attach the conductors
11. Close the access panel
12. Reconnect the power to the filter or filter bank at the breaker panel.
13. Perform an RF Shielding Effectiveness test according to the original Raymond EMC test procedure to ensure that the installation of the new filter did not degrade the RF Shielding Effectiveness of the Shielded Enclosure.

8. PERFORMING A GROUND ISOLATION CHECK

The Radio Frequency Shielded Enclosure was designed to be grounded at a single point. The following procedure should be performed by a qualified shielding technician or electrician to ensure that the RF Shield is grounded at a single point:

1. Disconnect the power to all power filters by tripping the breaker or opening the disconnect.
2. Disconnect / remove the Neutral wire from the power filter
3. Remove the ground wire from the dedicated ground stud
4. Measure the voltage between the ground stud and the ground wire. If there is a zero voltage potential between the ground stud and the ground wire, proceed with the next step. If there is a non-zero voltage potential between the ground stud and wire, the power source must be identified and removed prior to proceeding with the next step.
5. Measure the resistance between the ground stud and the ground wire with an analogue Ohm meter having a sensitivity of 20,000 Ohms per volt DC
6. The measured value should be greater than 1000 Ohms or within 10% of the isolation value recorded in the original test report, which was supplied with the enclosure. Should the value be less than 1000 Ohms, the grounding source(s) should be located and repaired to



ensure that the enclosure is performing to its maximum potential. Alternatively, reconnect the ground wire and contact Raymond EMC for assistance.

7. Re-connect the ground wire
8. Re-connect the neutral wire
9. Re-connect the power to all power filters

9. SERVICE CALLS

Business hours are 8 AM to 5 PM (EST), telephone 613-841-1663. After-hours phone numbers are listed on the Voice Mail system. Alternatively, refer to www.raymondemc.ca.

10. MAINTENANCE MATERIALS

The following is a list of recommended maintenance materials, which should be kept on-site:

ITEM	PART #	QUANTITY
Fingerstock – QuietDoor	REMC-QDFS-18	4 – 18” lengths
Scotchbrite Abrasive Pads	#97	1 each - 4” x 6”
Methyl Hydrate		As required
Putty Knife		1
Silicone Lubricant		As required

These materials may be obtained through Raymond EMC Enclosures Limited, either separately or in a Maintenance Kit MK-102 for shielded enclosures, which includes the above noted items.