Raymond EMC
QuietCab QC-37RU

Cabinet for
COTS Rackmount Equipment

Information Manual

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1. RAYMOND EMC QuietCab

Raymond EMC QuietCab provides the shielding effectiveness of a standard Raymond EMC Shielded enclosure in a compact and maneuverable package. The QuietCab is the perfect shielding solution for customers who need to integrate rack mount “Consumer Off of the Shelf” (COTS) equipment into a harsh EMC environment.

Based on the tried and proven QuietDoor and QuietBox technology, the 33” wide x 45” deep x 82” high QuietCab maneuvers on casters through standard office door ways. Each cabinet is equipped with its own power line filter, receptacles and ventilation system. Simply plug the QuietCab into any receptacle and it is ready for use.

QuietCab can be customized to suit our customers’ needs, and can be ordered with a variety of standard options including:

- Up to a 37u 19” rack
- Up to 6 each 30 Amp Filtered power line feeds, 120V, 208V, 240V
- Rack mountable power bars:
  - Up to 8 each NEMA 6-20ra receptacles
  - Up to 8 each NEMA 5-20ra
- Up to 288, 1 G-Bit duplex LC fiber optic connections, other connector styles are available.
- Filtered ventilation system for 12000, 24000 or 36000 BTU load
- Height-adjustable casters
- Black Satin powder coat paint finish. Other colors are available.
- Secure door and fiber access panels

2. PERFORMANCE SPECIFICATIONS

Each QuietCab meets or exceeds the following codes and standards where applicable:

- CSE Specification: ITSG-02 "Criteria for the design, fabrication, supply, installation, and acceptance testing of walk-in radio frequency shielded enclosures. December 1999.

- IEEE Std 299-1997 "IEEE Standard Method for Measuring the Effectiveness of Electromagnetic Shielding Enclosures", 21 April 1998. To be completed at time of installation prior to absorber installation

- ASTM E-84-81A Test for Surface Burning Characteristics of Building Materials.

- MIL-F-15733 Filters, Radio Interference, General Specification for. ANSI/UL-1283 Standard for Safety, Electromagnetic Interference Filters
- MIL-STD-220A - Method of Insertion Loss Measurement for Radio Frequency filters.
- MIL-STD-285 Method of Attenuation Measurements for Electromagnetic Shielding Enclosure for Electronic Test Purposes.
- MIL-STD-461E, “Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment.”
- UL 1283 - Standard for Safety - Electromagnetic Interference Filters.
- Canadian Electrical Code.

3. DESCRIPTION

3.1. RF SHIELDING PERFORMANCE

The QuietCab arrives to site having been fully tested at Raymond EMD as per ITSG-02, and meets and exceeds the following shielding effectiveness levels:

Magnetic: 55 dB @ 10 kHz, 95 dB @ 200 kHz, 100 dB @ 1 MHz

Electric/Planewave/Microwave: 100 dB from 1 MHz to 10 GHz

3.2. DOORS

The door units are factory assembled, consisting of door leaf, doorframe, hardware and electrical contact strips. Door hardware consists of the following: four lift off 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 lever actuated type latch. 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.

As a standard we have included 2 each 28” x 74” secure doors. One on the face and one on the back of the enclosure. Lever latches are utilized with a maximum 10 Ibs latching force.

3.3. HONEYCOMB WAVEGUIDE AIR VENTS

Supply and return ventilation is filtered through two 18” x 24” honeycomb waveguide vents. Ventilation system forces cooling air through the Waveguide vents. See ventilation system below.

3.4. FIBREOPTIC PENETRATIONS

Fiber optic connections are made through a network of patch fibers. Each patch fiber passes into or out of the cabinet though a Waveguide above cutoff penetration. Mating patch panels are provided on the exterior and interior of the cabinet. The external patch panel is accessible through the removable security cover.

Cabinets can be ordered with up to 288 (in multiples of 12) duplex fiber optic interconnects. With a maximum of 144 on the rear and another 144 on the front of the cabinet. Patch cables can be ordered as 50/125um multimode or 62.5/125um multimode. All fiber optic patch cables are loop back tested at a wavelength of 850nm, other wavelength testing is available.

3.5. POWER FILTERS

All incoming electrical conductors are filtered through radio frequency filters approved to meet the Canadian Electrical Code. Each QuietCab comes standard with a 2x30A, 120V, 60Hz power filter. 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).

Cabinets can be ordered with a maximum of 6 each 2x30Amp filters.

3.6. ELECTRICAL

The QuietCab is equipped with a rack mounted power bar. All incoming power filters are supplied with a 10' "cabtire" cable terminated with an approved twist lock plug. Standard Options include:

- Up to 6 each 30 Amp Filtered power line feeds, 120V, 208, 240 V30 amp twist lock plugs (L5-30 for 120V L6-30 for other voltages)
- Rack mountable power bars with:
    - 8 each NEMA 6-20ra receptacles
    - 8 each NEMA 5-20ra
- Grounding lug located at incoming power panel of the cabinet.

3.7. VENTILATION

Air flow is directed from the base of the enclosure along the full height of the rack and exhaust out the top. A removable and serviceable air filter is located on the bottom of the Cabinet.

A three stage programmable closed loop digital temperature controller monitors temperature inside the cabinet and activates banks of high efficiency axial fans to control temperature. A piezzo alarm is incorporated to alert the end user of a potential cooling problem. The cooling requires a 110V circuit which uses a 5-15ra receptacle.

The QuietCab comes standard with a 12000 BTU/h ventilation system, and can be ordered with an optional 24000 or 36000 BTU/h system.

3.8. INTEGRATED RACK

A welded steel seismic designed rack is integrated into the cabinet. Standard configuration includes a 37U 19" rack pre-threaded for 10-32 screws. The rack has a standard satin black powder coat finish.

3.9. SEISMIC DESIGN

Our QuietCab is designed to meet seismic requirements. An Engineer is required to inspect the final installation for seismic approval.

3.10. CONSTRUCTION AND FINISH

Constructed from aluminum, the QuietCab has a standard satin black powder coat finish. Other colors are available. Other standard features include:

- 4 each 1000 lbs capacity dielectrically isolated leveling castors.
- 4 each lifting eyes on top

4. INSTALLATION and SET UP

Note: Do not stand up cabinet before completing step 4.3.

4.1. Carefully remove heat shrink covering and banding holding the cabinet to the shipping skid.

4.2. Unlatch one, or both, of the doors. Note: the R.F. seal makes opening the door stiff. A firm pull may be required.

4.3. Remove all items packed inside, any protective spacers or other loose materials.

4.4. Stand unit up on its casters, using the provided lifting rings if required. Be careful not to scratch, dent or twist the cabinet while lifting it vertical.

4.5. Ensure that all the leveling feet of the casters are retracted sufficiently to allow free rolling of the cabinet. Extend the ratchet lever arm and set the ratchet toggle to retract the leveling foot more if required. Push the lever arms back in before rolling the cabinet to its installation area.

4.6. Once the cabinet is rolled to its required position, extend the feet of the casters using the ratchet mechanism as required to level the cabinet. When level, push the caster ratchet lever arms back in.

4.7. Un-pack the Seismic Restraint Floor Brackets and hardware. Position the Seismic Restraint Floor Angles in front of each of the Adapter Brackets mounted at each of the casters. Align slots in the floor bracket with the threaded holes in the Adapter Brackets. Clamp the two brackets together. Mark the positions on the floor for the HSL M8/20 Hilti Heavy Anchors. Drill and install the Hilti Heavy Anchors.

Note: HHSL M8/20 Hilti Heavy Anchors not supplied by Raymond EMC.

4.8. Remove the jam nut and one of the fender washers from each of the bolts supplied for the seismic restraints. Just start threading the bolts into the threaded holes in the Adapter Brackets. Fill the empty spaces in the slots in the Seismic Restraint Floor Angles with MASON 0.5 Fast Epoxy Putty (Not supplied by Raymond EMC). The Epoxy Putty is available from Vibrasonic Control, 4004 Graveley St. Burnaby, BC Phone 604-294-9495) before tightening the bolts fully. Install the other fender washer and jam nut on the end to finish locking the assembly together.

4.9. Un-pack the Bottom Fan Tray. Locate power in receptacle on side of the Bottom Fan Tray. Orient the receptacle so that it will be next to the yellow power and controls cord extending from the bottom of the cabinet when you slide the tray into the tracks mounted beneath the cabinet. Slide the tray fully into the tracks. Screw the connector on the end of the yellow cord fully into the receptacle.

4.10. Un-pack the Fan Power Cord. Plug the Fan Power Cord into the grey receptacle on the lower back of the cabinet. Plug the Fan Power Cord into a suitable supply. The controller is pre-programmed for optimum cooling. User can redefine set points following the included programming guide.

4.11. Relocate the power bars inside the cabinet to the required R.U. positions to facilitate the installation of the user equipment.

4.12. Plug the power cords from the side of the cabinet into appropriately rated power supply receptacles. (110vac 30 amp 5L30 twist lock)

4.13. Install user equipment

4.14. Install equipment fiber interface to internal fiber patch panel, remove external fiber security panel, thread cable through rubber grommet and plug into corresponding external patch panel location. Replace side cover and secure plate using supplied hasps with user supplied padlocks.

4.15. Close doors and secure cabinet using the hasps in the door with user supplied padlocks.

Note: Because of the insertion force of the RF seal, the door needs to be initially slammed shut to engage it within its latching system. Once inserted simply rotate latch handle to fully engage the R.F. seal and finally close the handle.

5. MAINTENANCE

The QuietCab has been designed and fabricated to be as maintenance free as possible. Unfortunately some preventive maintenance is required to maintain RF integrity and cooling efficiency. The following schedule defines points of interest and is intended as a baseline. Site conditions and use of the cabinet should be considered and the schedule optimized accordingly.

The cabinet ships with a maintenance kit where all required material can be found. Additional material can be ordered through Raymond EMC.

5.1. Weekly Preventive Maintenance

5.1.1. Inspect air filter

The filter should be removed and inspected for cleanliness. Simply locate the D handle and slide the filter out. If it requires cleaning replace it with the provided spare filter. The dirty filter should be washed with water and a mild soap and left to dry.

5.2. Monthly Preventive Maintenance or 500 Cycles

5.2.1. Clean and lubricate RF seal

The RF seal consists of a hoop and an insertion knife. The hoop is located on the cabinet and along the entire perimeter of both door openings. It is comprised of a dual concentric ring of beryllium copper.

The knife is located on both doors and it consists of a continual hoop of 1/8" aluminum.
Open both doors. Wipe the beryllium copper with a clean lint free cloth wetted with Methyl Hydrate. Place the cloth the edge of a spatula and insert into the opening, lightly drag the assembly ensuring not to snag the seal. Using a maroon scotch brite pad lightly scrub the knife along both sides of its entire perimeter, finish by wiping with a cloth wetted with Methyl Hydrate.
The seal in now clean and requires a slight lubrication. Wet a cloth with De-oxit and wipe the knife. Close and latch the door several times to transfer the lubricant to the beryllium. The cabinet can now return to service.

5.2.2. Check operation of cooling fans

Cooling fans are located both top and bottom of the cabinet. Te ensure maximum cooling fans should be checked for operation.
Open both doors and locate the thermocouple located inside of the cabinet near the upper waveguide. Using your body temperature simply pinch and hold the end of the thermocouple. Once the controller hits 32C all fans should start. Ensure all fans are operational. In the event one fan does not start up please contact Raymond EMC for direction.

6. REPLACING FINGER STOCK

6.1. With the door in the fully open position, remove broken or loose pieces with needle-nose pliers.

6.2. 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. If lengths are located near corner(s) note the shape of the profile, the new fingerstock will have to be cut using standard scissors to the same.

6.3. Clean the aluminium doorframe with a Scotchbrite pad and wipe clean with a dry lint free rag wetted with methyl hydrate.

6.4. Snap in a new strip of fingerstock. Ensure that the fingers are fully seated in place.

7. MAINTENANCE MATERIALS

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

ITEM	PART #	QUANTITY
Fingerstock – QuietCab	REMC-DO44	2 – 18" lengths
Scotchbrite Abrasive Pads	REMC-AB20	2 each - 4" x 6"
Methyl Hydrate	REMC-SO09	1L bottle
Putty Knife	REMC-SO44	1
Contact Cleaner	REMC-SO03	1
Cloths	REMC-SO02	12

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

8. QUIETCAB DRAWINGS

See drawings attached.

9. SHIELDING EFFECTIVENESS TEST RESULTS

See report attached

10. FIBER OPTIC TEST RESULTS

See report attached