DMS-1* DIGITAL MULTIPLEX SYSTEM

J7209B RCT CABINET

DESCRIPTION, INSTALLATION, AND MAINTENANCE

CONTENTS PAGE

1. GENERAL

Scope

1.01 This section contains a detailed description of the J7209B Remote Concentrator Terminal (RCT) cabinets and associated hardware and cabling, and general instructions for their installation. Detailed work plans and installation instructions are the responsibility of the customers' outside-plant engineer.

1.02 *Reason for Reissue:* to add new and revised information.

Purpose

1.03 The J7209B cabinets are used in the DMS-1 Digital Multiplex System for housing RCT and associated apparatus.

DMS-1 DIGITAL MULTIPLEX SYSTEM

1.04 The DMS-1 Digital Multiplex System consists of a Control Concentrator Terminal (CCT) located in a central office, and up to four RCT located in huts or cabinets near groups of subscribers to be served by the central office. The CCT and RCT are interconnected in a loop, by either one, two, or three T1-type digital repeatered lines (one or two working lines plus one protection). A fully equipped system concentrates up to 256 subscriber lines at the RCT terminals onto the 48 digital channels of two T1-type lines for connections between the subscribers and the central office switching machine.

2. DESCRIPTION OF CABINET

PHYSICAL DESCRIPTION

2.01 The standard RCT cabinet (Fig. 1) measures 78 inches (198 cm) high, 92 inches (232 cm) wide, and 20 inches (51 cm) deep. The weight of the empty cabinet is approximately 1200 lbs. A fully equipped RCT cabinet weighs approximately 2400 lbs.

* DMS-1 is a trademark of Northern Telecom Limited

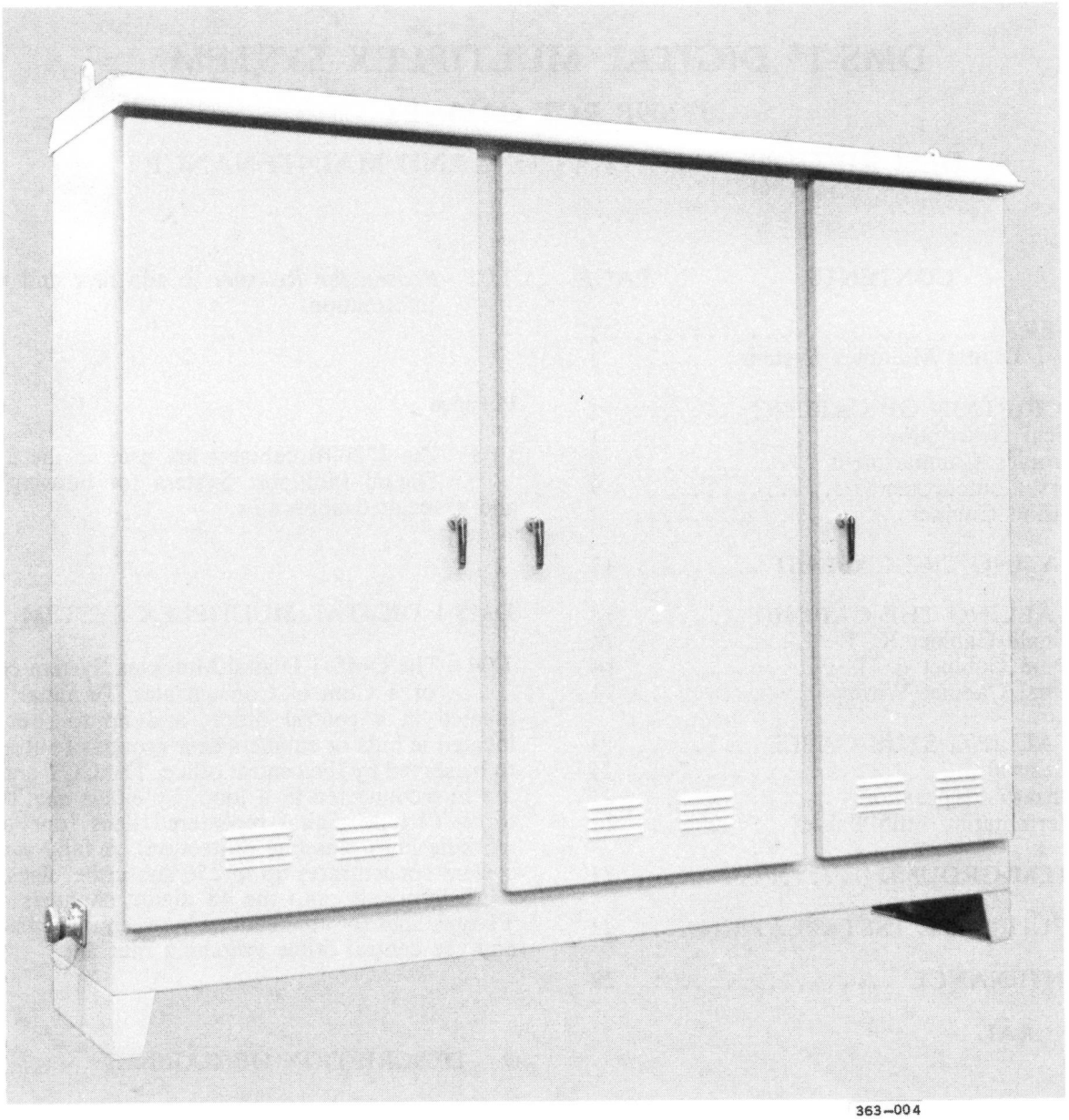


Fig. 1 — RCT Cabinet

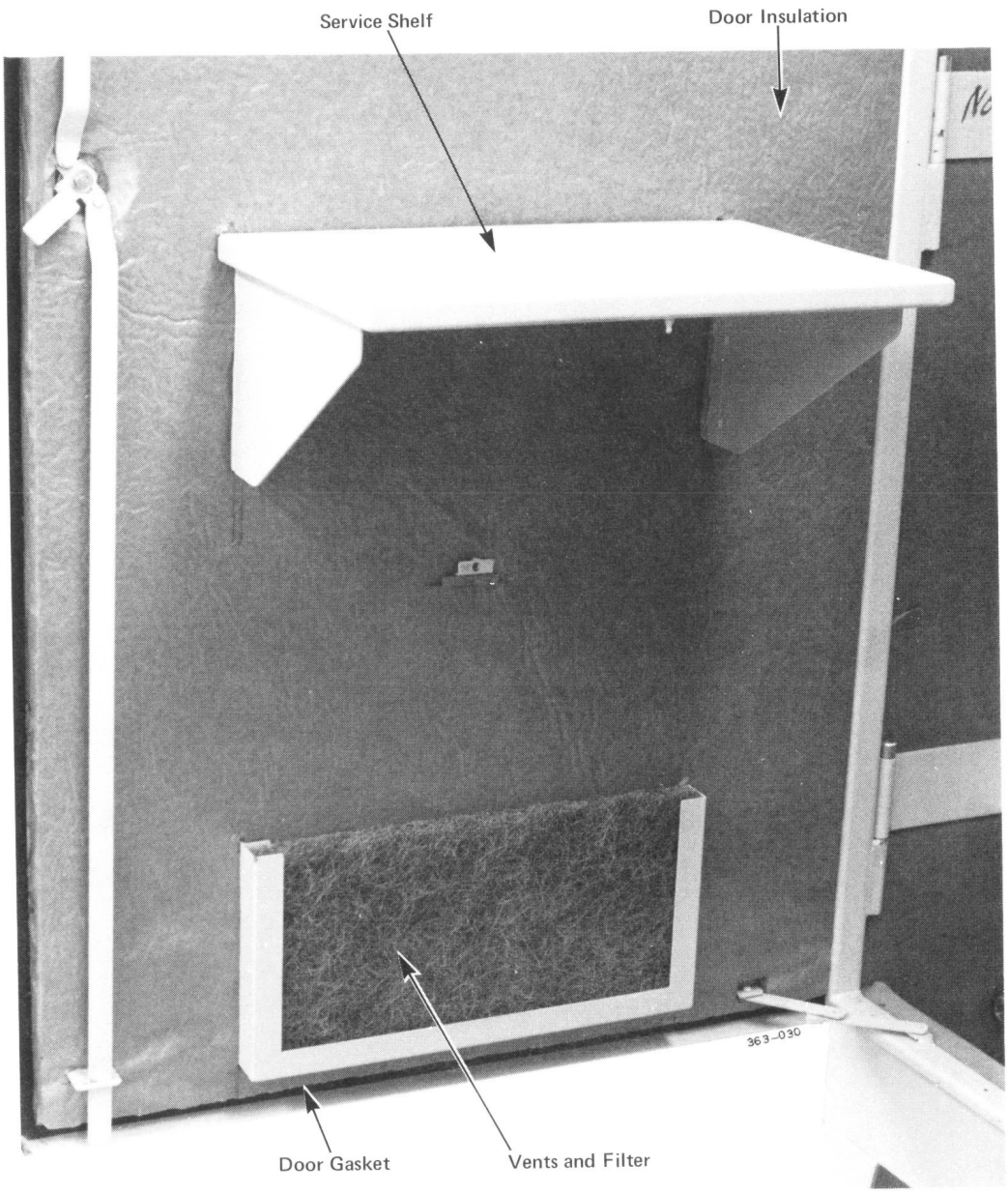


Fig. 2 — Door Gasket, Service Shelf, Vents and Filter

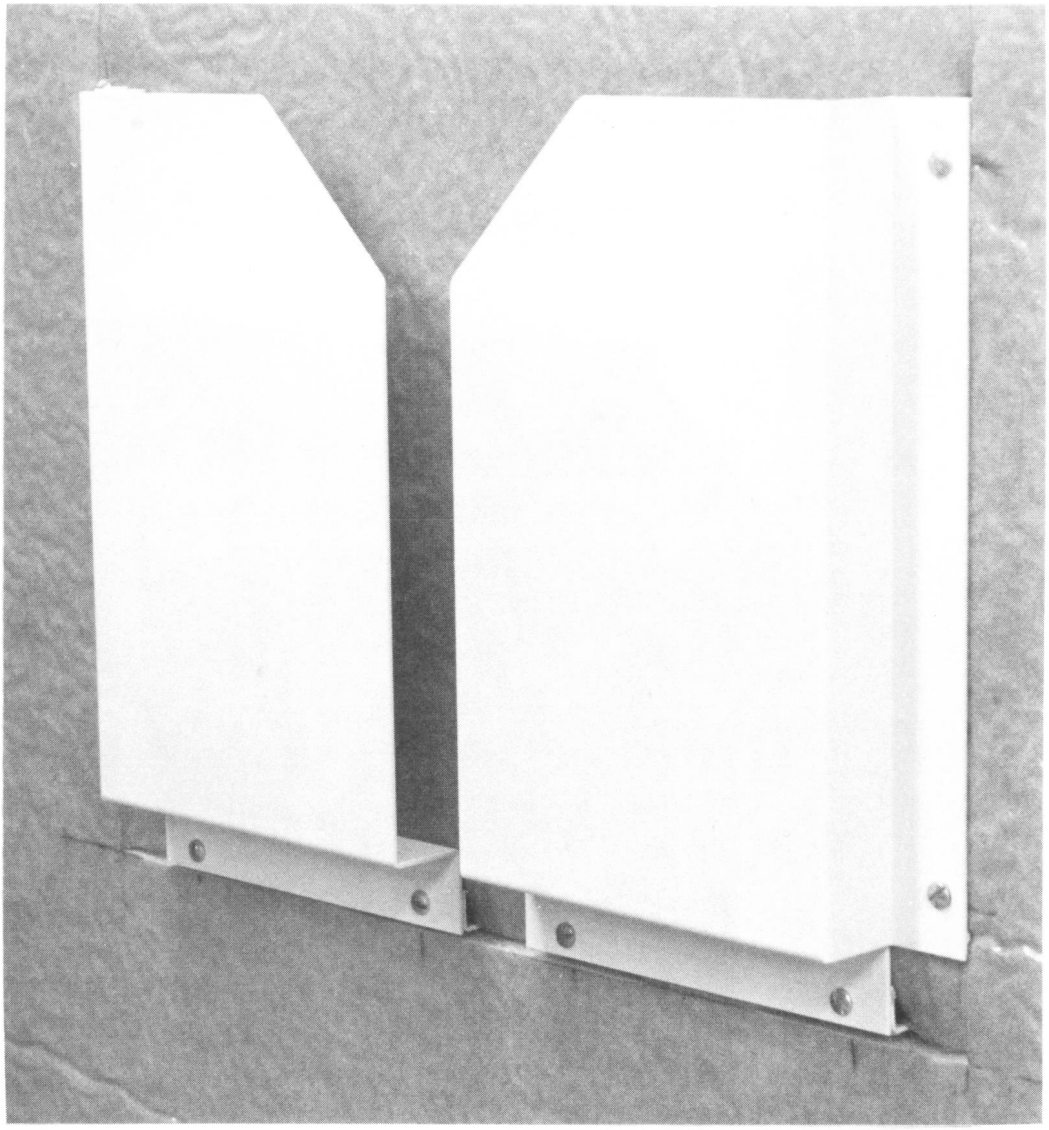


Fig. 3 — Instruction Sheet Pocket

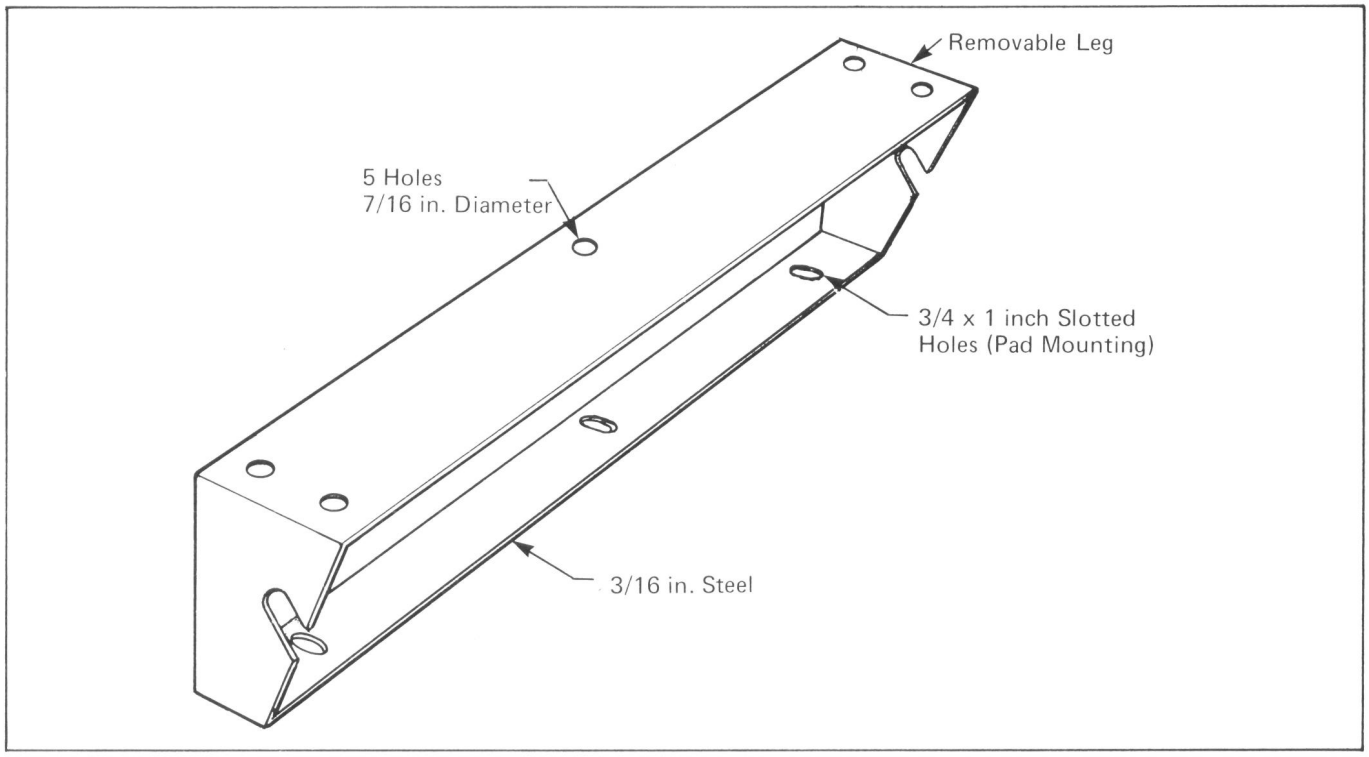


Fig. 4 — Removable Legs

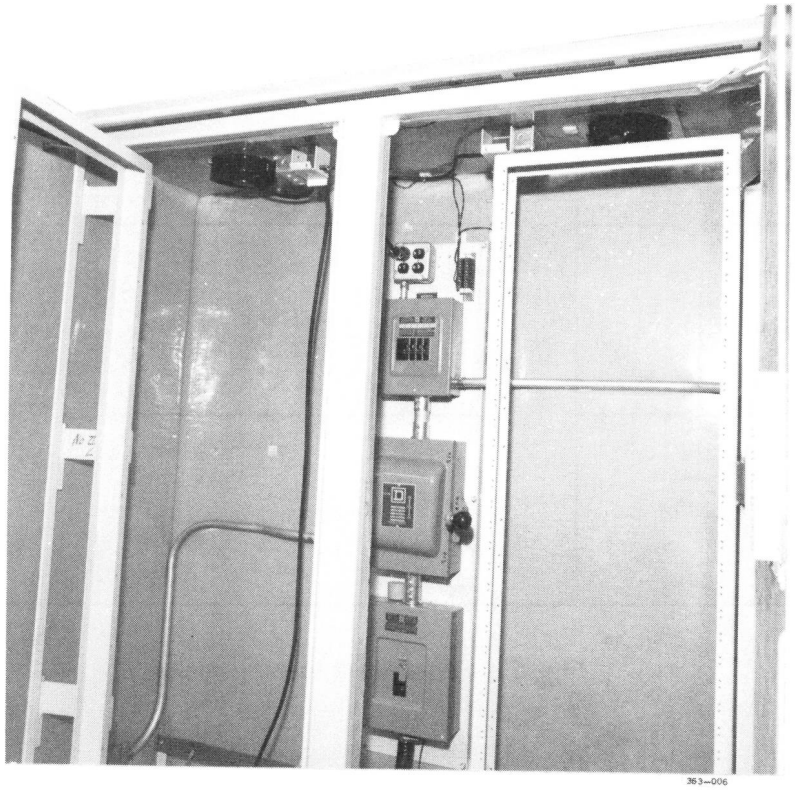


Fig. 5 — Bay Frame Hinged Open

2.02 The housing is constructed of 11-gauge steel. It is assembled by welding. The three doors are attached to the cabinet with steel hinges and hinge pins. Each door can be opened and closed by means of a chrome-plated handle. The handles can be locked with padlocks. Each door features a lower-hinge arm which is self-locking in the open position to provide wind-strain relief. The doors are insulated with 1-inch thick flexible foam and are made weathertight by 1/8-inch thick, closed-cell neoprene gasketing placed around the inner perimeter of each door (Fig. 2). Each door has air intake louvres near the bottom. The air intake is filtered for fan ventilation of the cabinet in summer. The two doors on the left provide access to the electronics and feature a service shelf (Fig. 2) and instruction sheet pocket (Fig. 3). All three doors are equipped with a door-open switch.

2.03 The remaining inner walls of the cabinet, with an exception of the dividing panel between the electronics compartment and the battery compartment, are insulated with 1-inch thick foam. Corrosion protection is provided by zinc chromate and polyurethane paint finish.

2.04 Removable legs are attached to the bottom of the cabinet by 3/8-inch bolts for concrete pad mounting (Fig. 4). The cabinet is secured to the pad by 1/2-inch anchor bolts embedded in concrete. A 1/4-inch Neoprene gasket is supplied with the cabinet for pad mounting to minimize galvanic corrosion at the leg/pad interface.

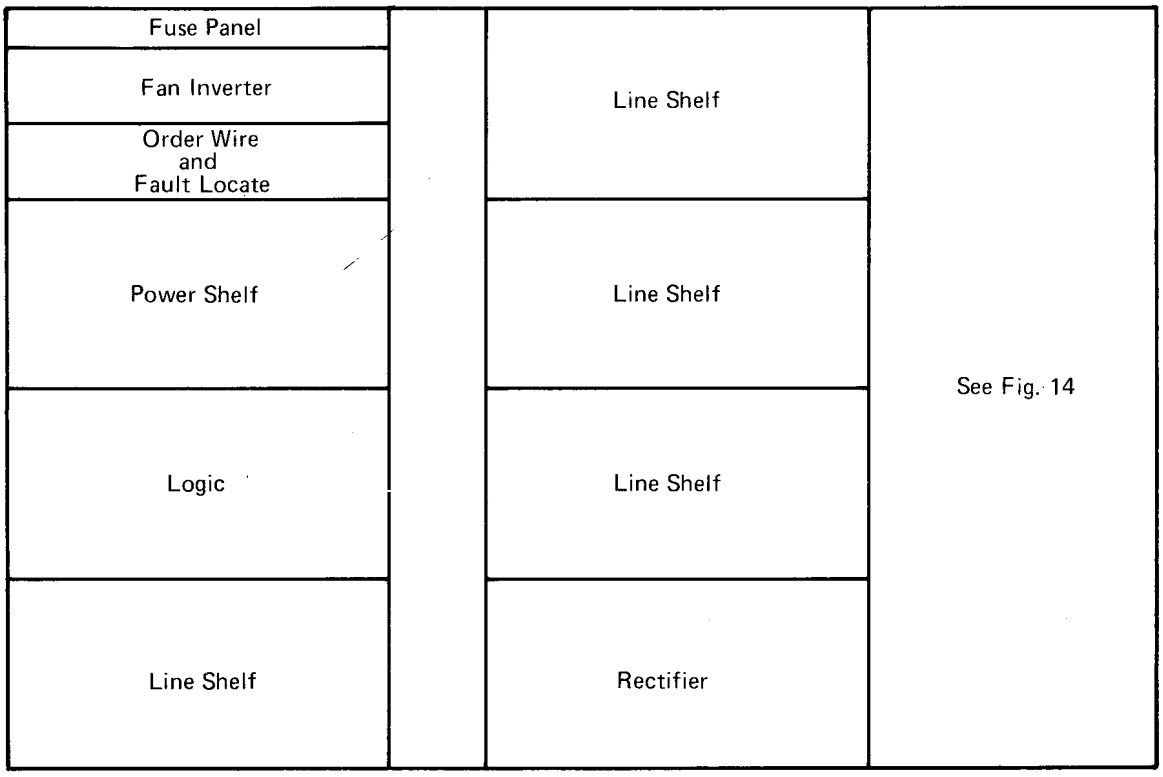


Fig. 6 — Equipment Arrangement

2.05 The double roof of the cabinet provides thermal relief from sun loads; and protection for the two exhaust fans and the bellows/louvre assembly.

ELECTRONICS COMPARTMENT

2.06 The electronics compartment has offset-hinged bay frames, which permit access to the back of the shelves for installation and servicing (Fig. 5). The bay frames are 19-inch wide U-channel construction and can accommodate the equipment shelves in the order shown in Fig. 6. Each frame is supported by a roller bearing in combination with a bearing plate in the floor of the cabinet. Cable guides are provided on the back of each frame for the Ansley-type flat cabling or the NE-808A type vf cabling (Fig. 7). In addition, the equipment is grounded through a No. 6 tinned-copper wire which runs vertically up the back of each bay frame. Oval tinned-copper braid is soldered to the ground wire to provide the necessary flexibility for hinging the frame and wire. The opposite end of the braided wire is attached through a ground clamp to the copper ground bar located at the bottom rear of the cabinet (Fig. 8).

2.07 The air in the equipment compartment is circulated by two thermostatically controlled fans rated at 270 cfm each. The fan thermostat closes at +50°C and opens at +30°C. The fans are located directly over the bay frames and are secured to the inner roof. They may be removed for replacement. Gravity-type louvres complement each fan, and blow open when the fans operate to remove hot air from the cabinet.

2.08 Additional environmental control is provided by a thermostatically controlled, 500-W, strip-type heater located on the floor of the equipment compartment. This thermostat closes at +10°C and opens at +25°C. The heater is enclosed by a protective cover. Air flow through this cover must not be obstructed, therefore no material of any kind must be placed on top or at the sides of the heater cover.

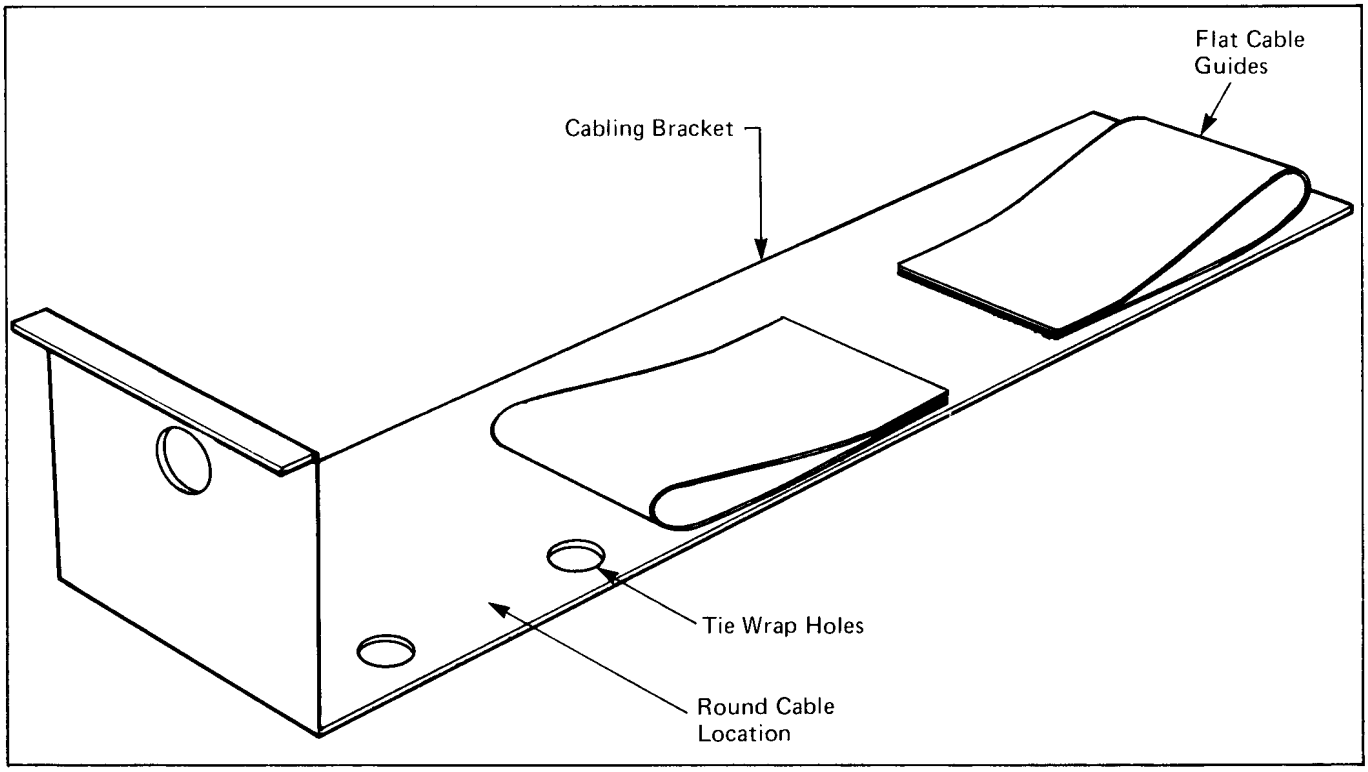


Fig. 7 — Cabling Bracket — Bay Frame

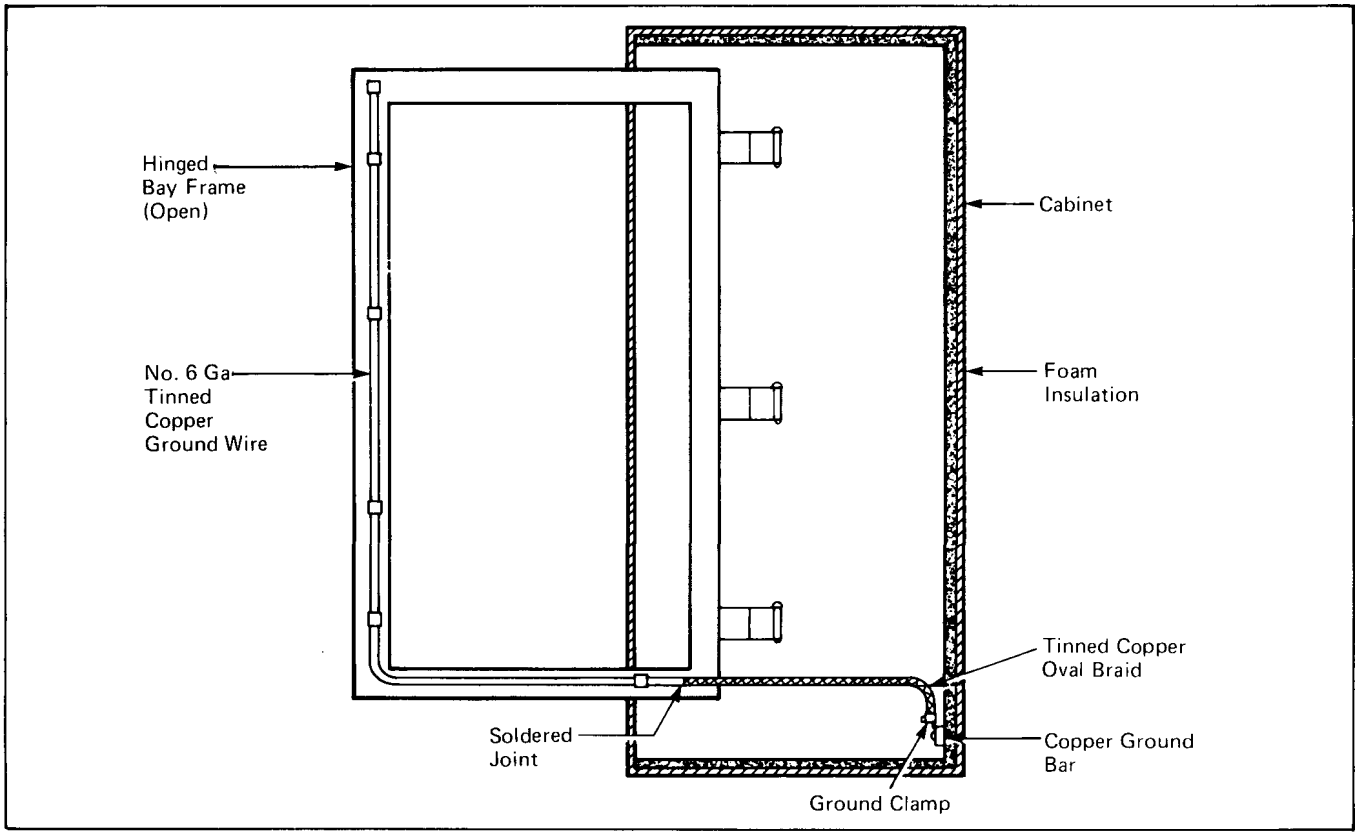


Fig. 8 — Equipment Grounding

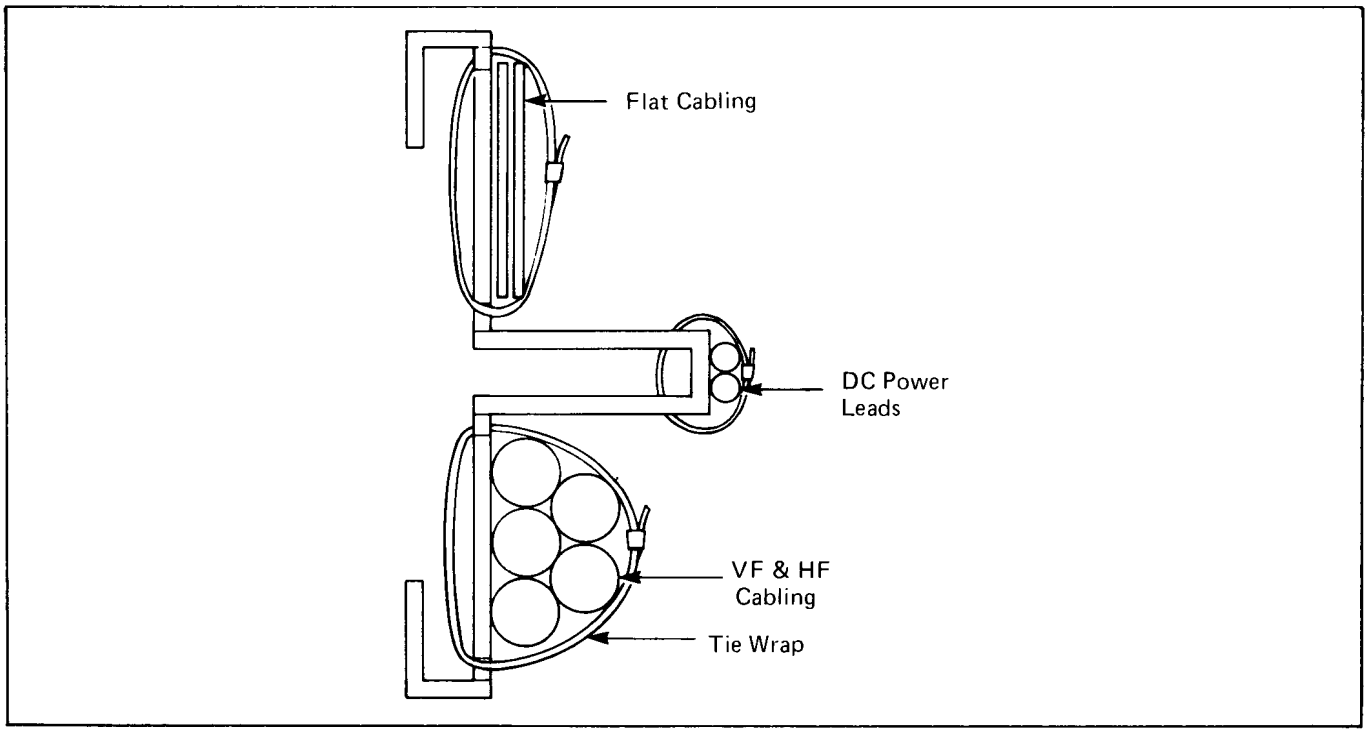


Fig. 9 — Cabling Channel and Brackets

2.09 High- and low-temperature sensors are strategically located to signal temperature alarms to the central office. The high-temperature alarm activates at $\geqslant +60°C$; the low-temperature alarm engages at $\leqslant 0°C$.

BATTERY COMPARTMENT

2.10 The vf and hf cable pairs are routed along the cabling channel located at the bottom front portion of the cabinet to the cross-connect field located in the battery compartment. Cabling brackets are provided to secure the vf and hf cables (Fig. 9).

Note: Generous bends are required at all cable hinging points. A minimum bend radius of 6 inches (0.15 m) is recommended.

2.11 Primary power cabling is routed through 1-1/4 inch conduit, located in the bottom of the cabinet, to a power distribution panel mounted on the back wall of the equipment compartment between the two bay frames. This panel consists of the components shown in Fig. 10. Current and fusing requirements are detailed in 363-2011-150, Table A.

Note: Power installation must be done by qualified personnel from the electric power company in accordance with local instructions.

A 110/220-V ac power receptacle and plug are provided on the side of the cabinet for an emergency power connection. The plug can be wired as required to a cable from a motor generator or other emergency source; e.g., when an outage on the primary supply is likely to exceed the RCT battery capacity.

2.12 The dividing panel between the compartments has a rectangular cutout to allow cable passage from the equipment to the cross-connect field. Mounting holes for battery shelves, the order-wire facilities, and battery terminal blocks are also provided.

2.13 Individual battery shelves may be mounted or removed as necessary to accommodate the 12-V gelled-electrolyte batteries used for backup power of −48 V dc. Up to 32 batteries can be installed in the cabinet as shown in Fig. 11. Batteries are wired in series groups of four, which in turn are wired in parallel through terminal blocks located on the dividing panel. Stranded 14-gauge copper wire is used for the series wiring, whereas 10-gauge stranded copper wire is used for the parallel wiring (Fig. 12).

2.14 The rectifier located in the electronics compartment is connected to the battery for recharging purposes by 10-gauge stranded copper wire. Similarly, the fan inverter is connected to the batteries to power the fan at the left during primary power outages (Fig. 13).

2.15 The hinged swing panel accommodates two NE-134QA1B-100 protector blocks (Fig. 14). Standard protector units are NE-6A1QA gas tubes.

2.16 The front side of this panel is used to mount eight NE-66QAC-50 connector blocks, which act as the interface between the equipment pairs and the distribution pairs. (See Part 6 for pair termination detail.)

2.17 The entrance gland of the telephone cable is weathertight and incorporates strain relief for the cable. It is situated in the floor of the cabinet just behind the hinged swing panel, near the hinge point. A bonding bracket is provided here for attachment of the QCM2A bonding clamp and cable sheath (Fig. 15).

2.18 Environmental control of this compartment in summer is assisted by a bellows/louvre assembly in the roof, plus ventilation louvres in the door. A thermostatically controlled 350-W heater is used in winter to keep batteries warm and connections dry. The thermostat closes at +12°C and opens at +20°C.

EXTENSION CABINET

2.19 The number of subscriber lines served at one RCT location can be expanded to 256 by either adding a second initial cabinet (with common equipment and power) or an extension cabinet. The extension cabinet is identical in size and shape to the initial cabinet. The extension cabinet comes equipped with:

- up to 4 line shelves
- protection and cross-connection for up to 200 pairs
- heater and thermostat in the electronic compartment
- temperature and door alarms
- fan and thermostat, and
- duplex receptacle 120 V.

Wiring between the cabinets passes through an interconnecting duct on the rear wall (Fig. 21).

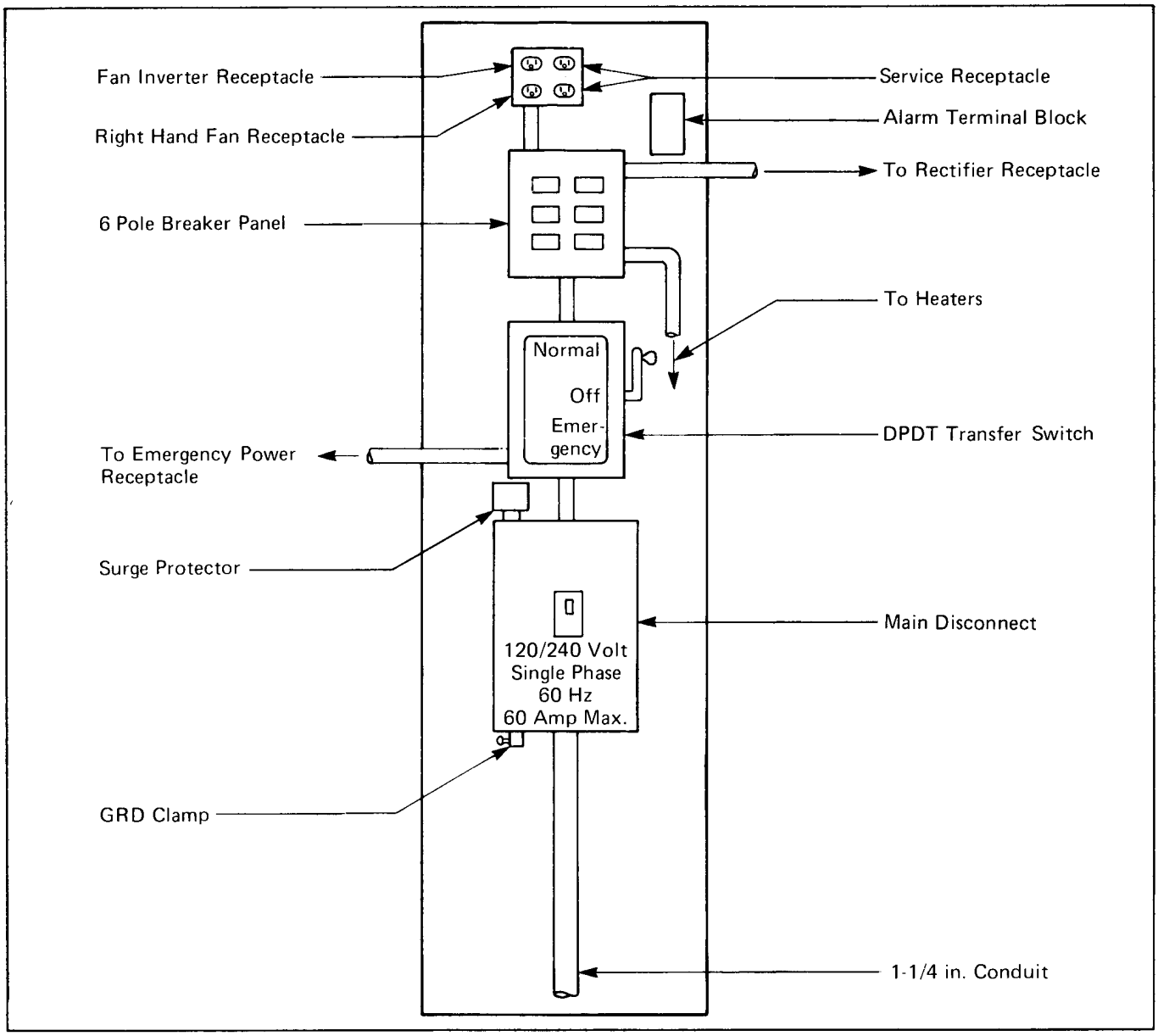


Fig. 10 — Power Distribution Panel

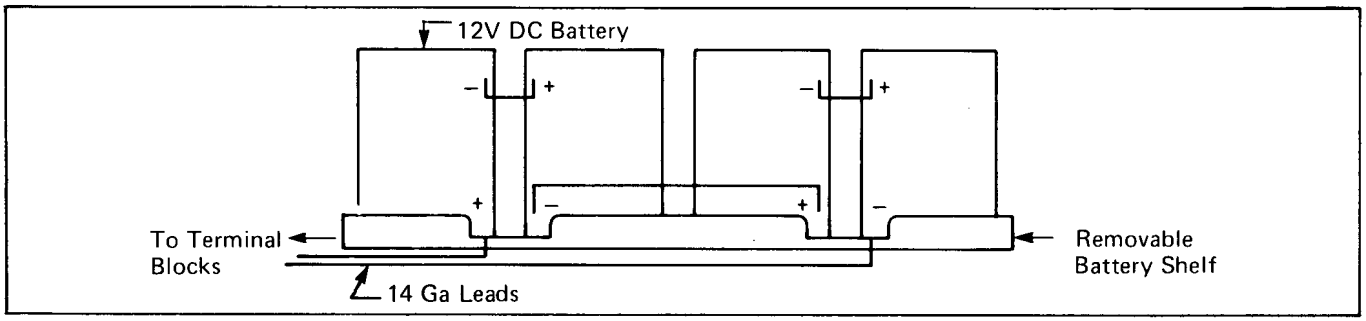


Fig. 11 — Battery Mounting and Wiring Details

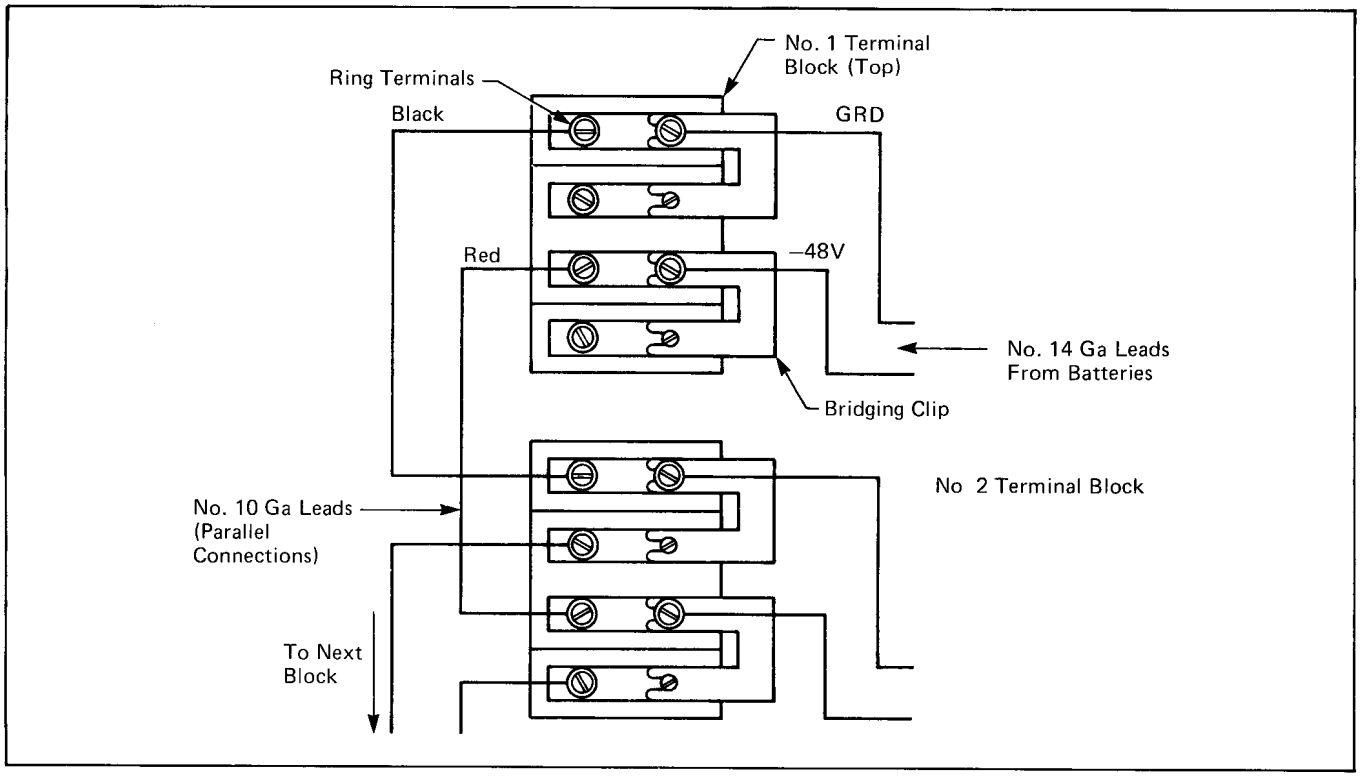


Fig. 12 — Battery Terminal Wiring

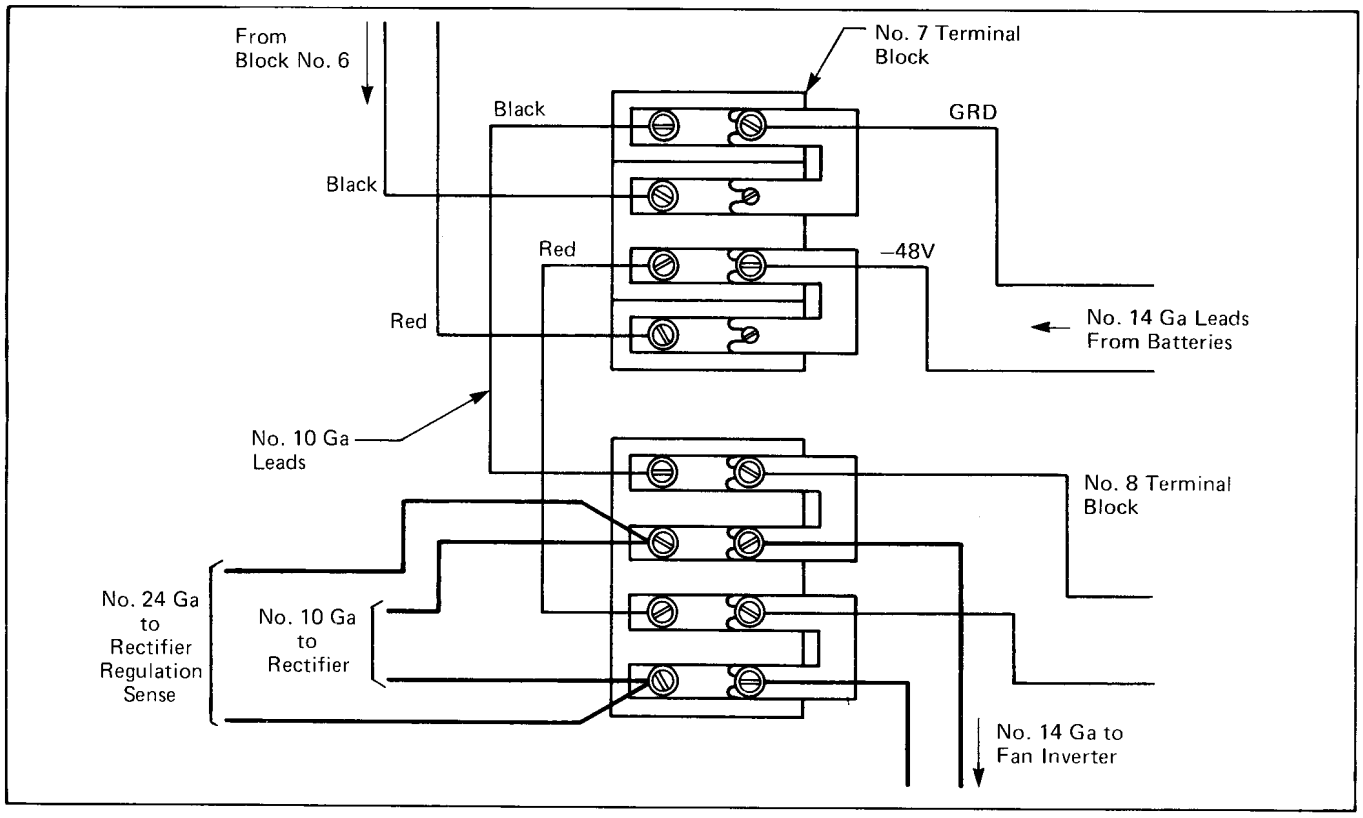


Fig. 13 — Fan Inverter, Batteries, and Rectifier Wiring

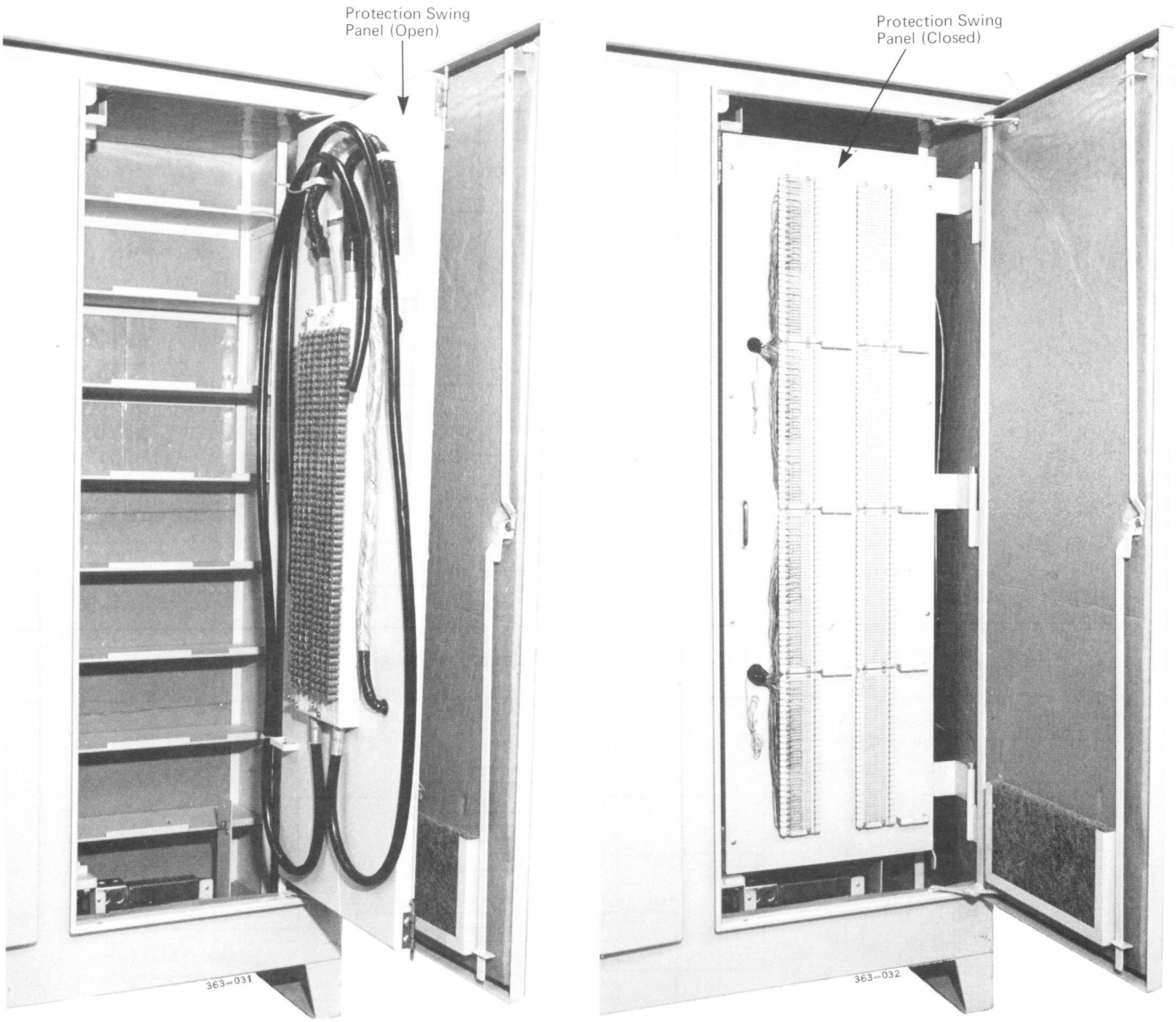


Fig. 14 — Hinged Swing Panel and Protection Blocks

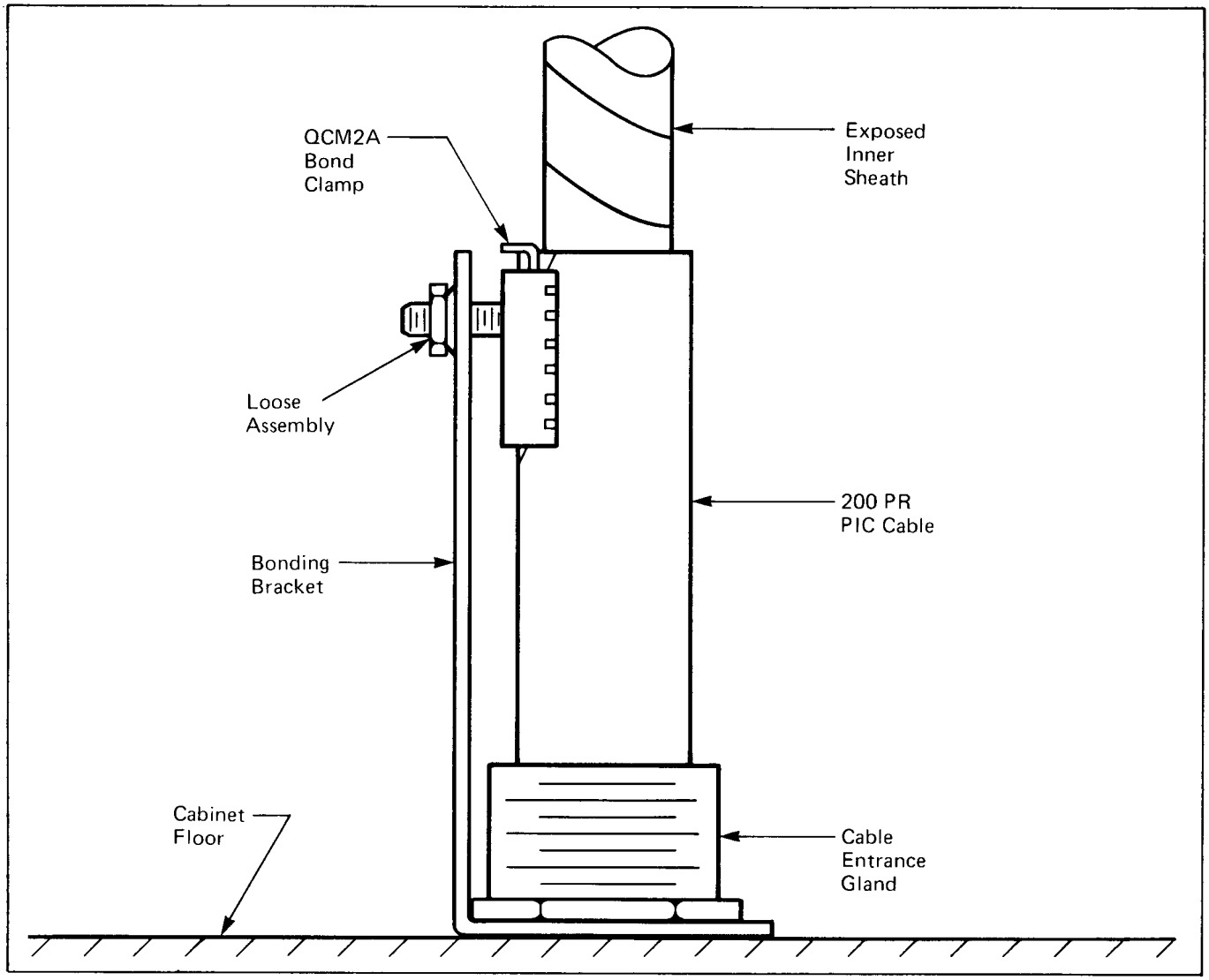


Fig. 15 — Bonding Bracket and Cable Sheath

3. LOCATING THE CABINET

3.01 The use of a concrete pad is the recommended method of mounting the RCT cabinet. A typical concrete pad is shown in Fig. 16.

Note: The cabinets must be located well above local flood plains for protection of the cabinet and the electronic equipment. The cabinets should also be levelled, using a standard carpenter's level.

4. INSTALLING THE CABINET

A. Single Cabinet RCT

4.01 Pour a concrete pad for mounting the cabinet. Pad construction and mounting stud centers are shown in Fig. 16. The pad size and construction may be modified to meet local requirements. Locations of conduits for power, and subscriber and digital line cables are shown in Fig. 17.

Note: Floor anchors can be used as alternatives to mounting studs set into the pad.

4.02 When the pad is ready, place the 1/4-inch (6.35-mm) Neoprene gaskets, provided with the cabinet, over the mounting studs on the pad (Fig. 18).

4.03 Secure each end of a suitable lifting cable to the lifting notches in the legs of the cabinet (Fig. 19). Attach a crane hoist to the center of the lifting cable and raise the housing to the required mounting height. Guide the cabinet during hoisting with a handline(s) secured around the bottom of the cabinet.

4.04 Install a length of weathertight flexible conduit between the power conduit on the pad and the nipple entrance to the cabinet. This should be installed in accordance with local electrical codes and connected to the ac breaker as shown in SD7209 Section G.

4.05 Pull the vf distribution cable in through the bottom of the cabinet (Fig. 18). Tighten the cable gland to seal the cable entrance.

B. Dual Cabinet RCT

4.06 Install both cabinets back-to-back on the concrete pad; following the procedure of 4.02 through 4.05. The spacing between two cabinets must be 3 ± 0.5 inches (76 ± 13 mm).

4.07 Open the doors of the equipment compartment in the initial cabinet, and remove the shipping plate from the dust opening located to the right of the hydro panel on the back wall of the cabinet (Fig. 20). Also, remove the wooden plug from the duct opening of the extension cabinet.

4.08 Using GE silicone adhesive sealant, apply a 1/4-inch (6-mm) bead of caulking around the duct opening on the inside wall of the initial and extension cabinets (Fig. 21).

4.09 From the inside of the initial cabinet, place the duct and flange assembly in position, and allow the duct to protrude through into the extension cabinet.

4.10 Secure the duct and flange assembly in place with lock washers and nuts.

4.11 Install a 3-inch (76.2-mm) lock nut on the threaded end of the duct from inside the extension cabinet until flush with the inside wall of the cabinet. Caulk around the lock nut with GE silicone sealant.

4.12 Place the cover plate over the duct, and slide it against the sealant applied around the opening and lock nut.

4.13 Install a second 3-inch (76.2-mm) lock nut, and secure the cover plate in position. The entire assembly is now watertight and ready for cabling between the two cabinets.

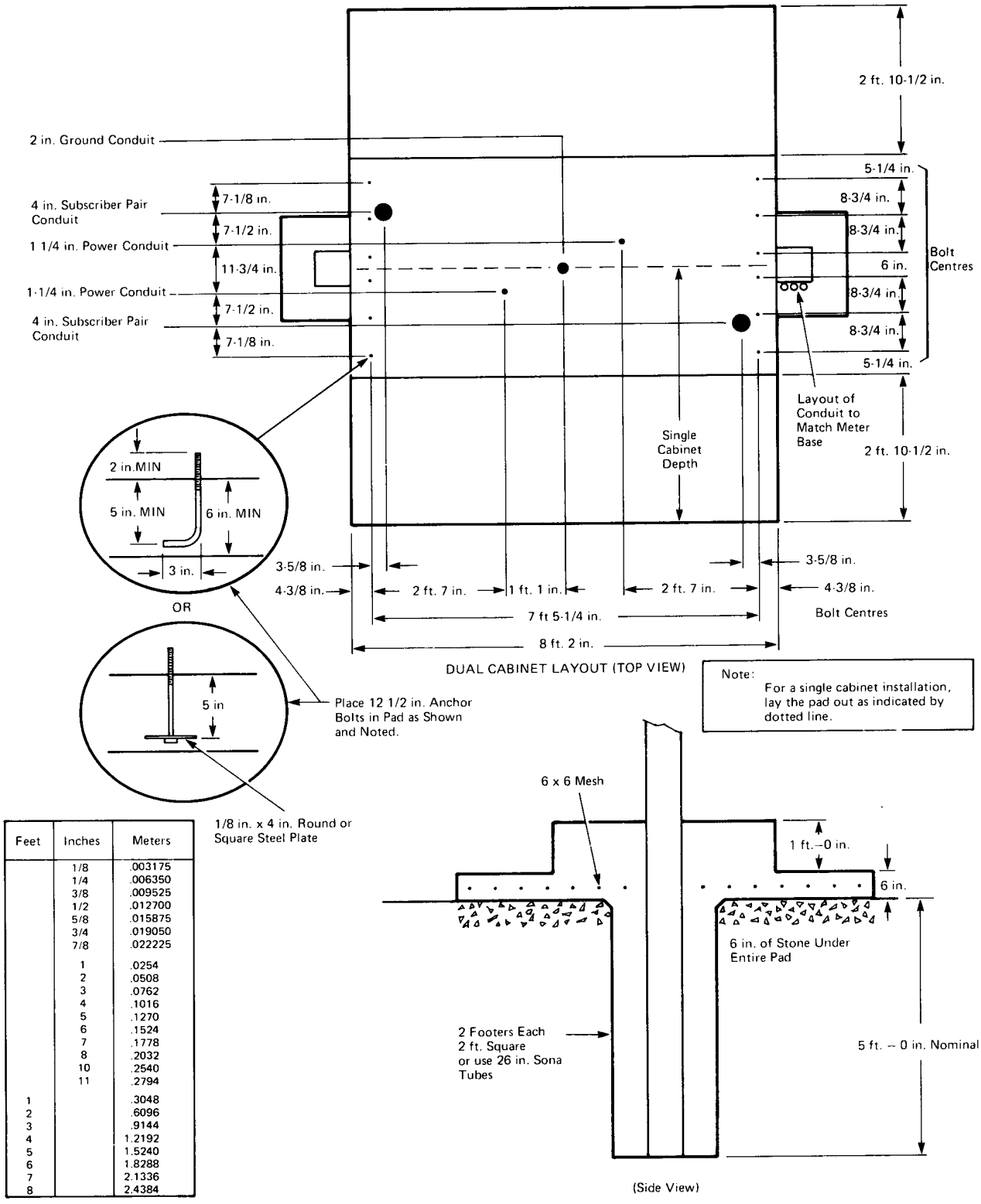
C. Dual Cabinet Wiring

4.14 Connect the bx power cable from circuit breaker No. 5 of the initial cabinet to the heater of the extension cabinet.

4.15 Connect the bx power cable from circuit breaker No. 2 to the duplex plug receptacle located in the center of the extension cabinet.

4.16 Connect the fan power cord to the lower part of the duplex receptacle. The upper part of the duplex receptacle is available for service needs.

4.17 Connect alarm pairs, power leads, flat cabling, etc., as shown in the cabling figures of SD7209-01 Section G.



Feet	Inches	Meters
	1/8	.003175
	1/4	.006350
	3/8	.009525
	1/2	.012700
	5/8	.015875
	3/4	.019050
	7/8	.022225
	1	.0254
	2	.0508
	3	.0762
	4	.1016
	5	.1270
	6	.1524
	7	.1778
	8	.2032
	10	.2540
	11	.2794
1		.3048
2		.6096
3		.9144
4		1.2192
5		1.5240
6		1.8288
7		2.1336
8		2.4384

Fig. 16 – Concrete Pad Construction

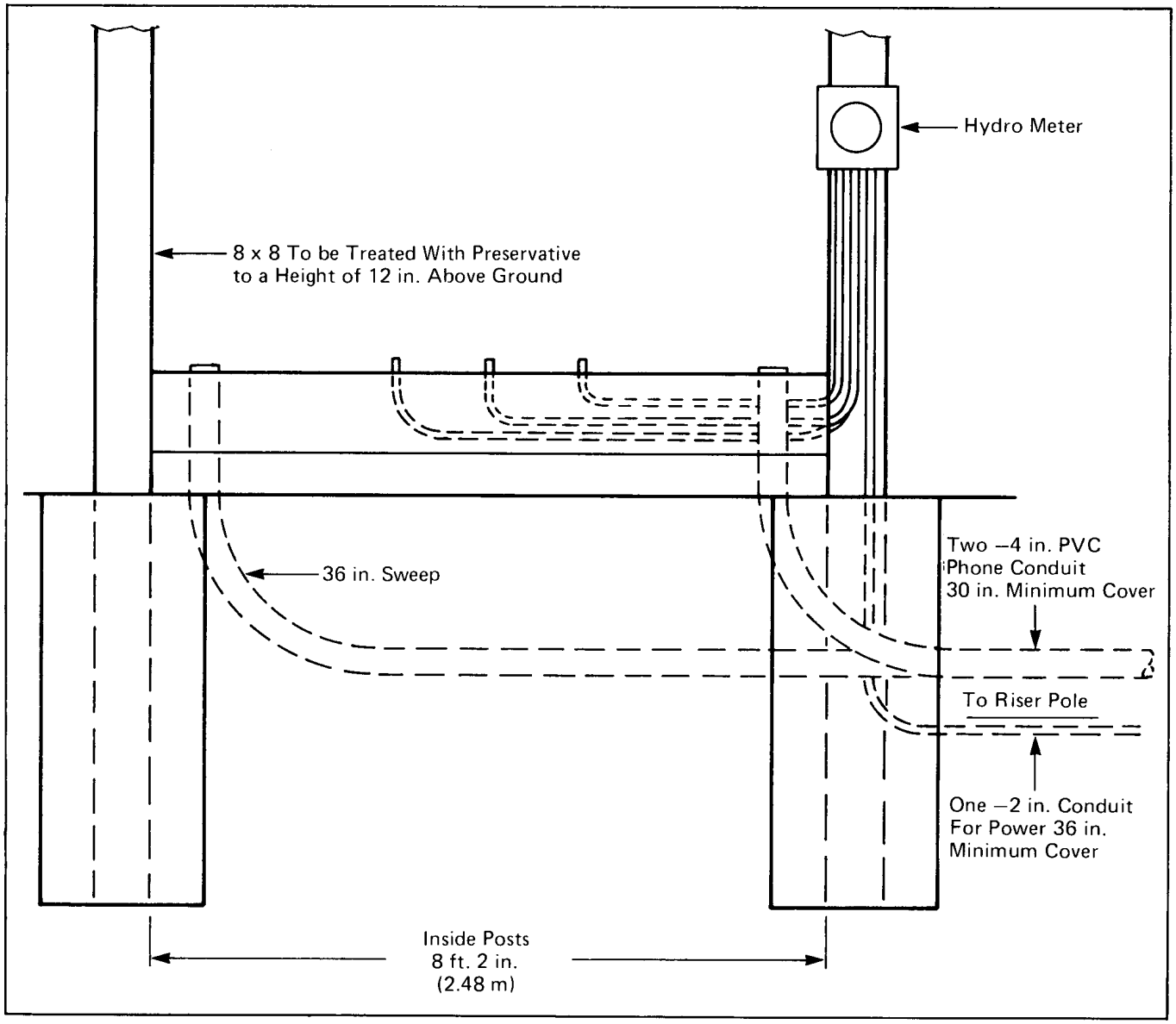


Fig. 17 – Conduit Locations

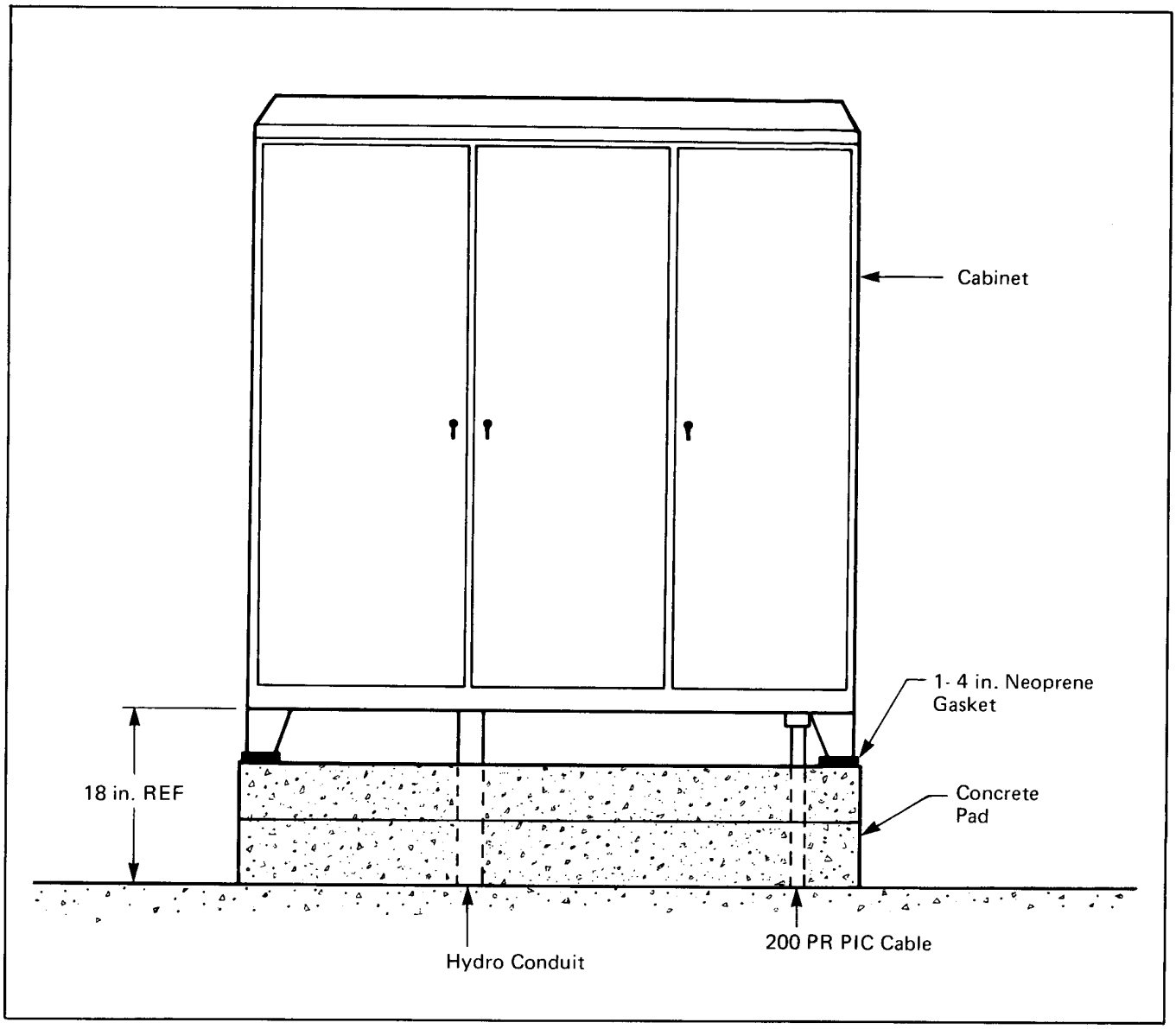


Fig. 18 — Concrete Pad Installation and Construction

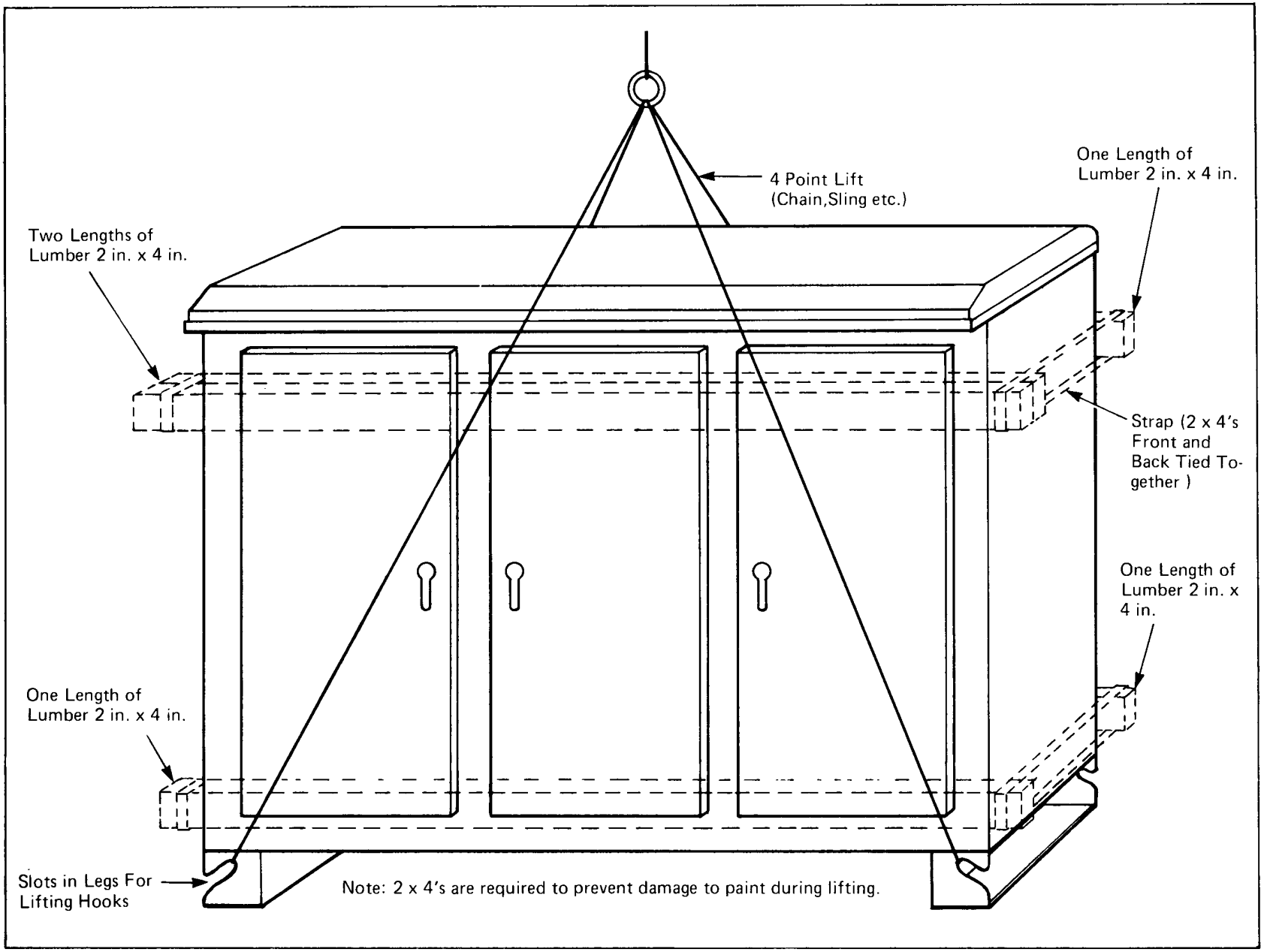


Fig. 19 — Suggested Lifting Method for RCT Cabinet

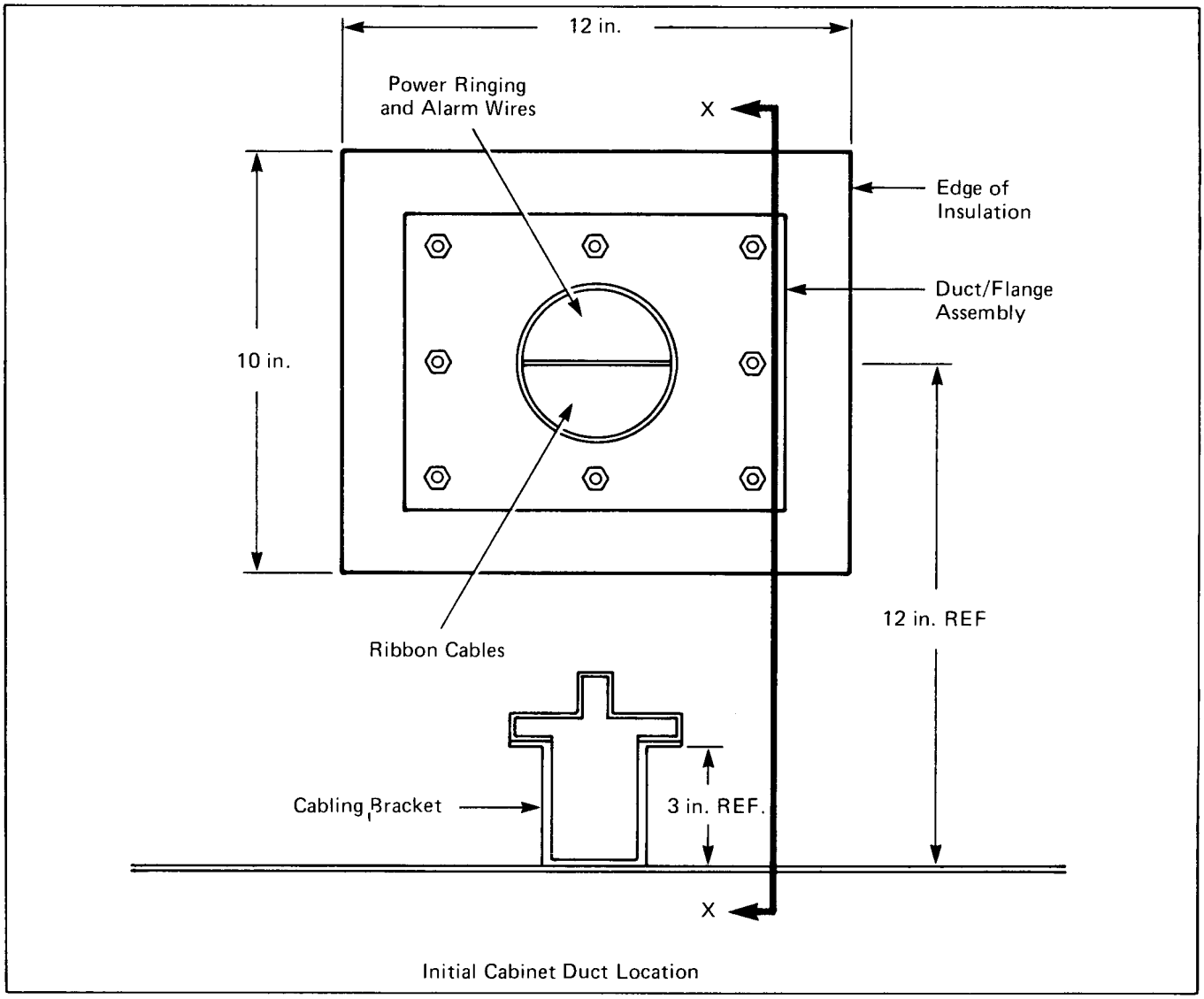


Fig. 20 — Initial Cabinet Duct Location

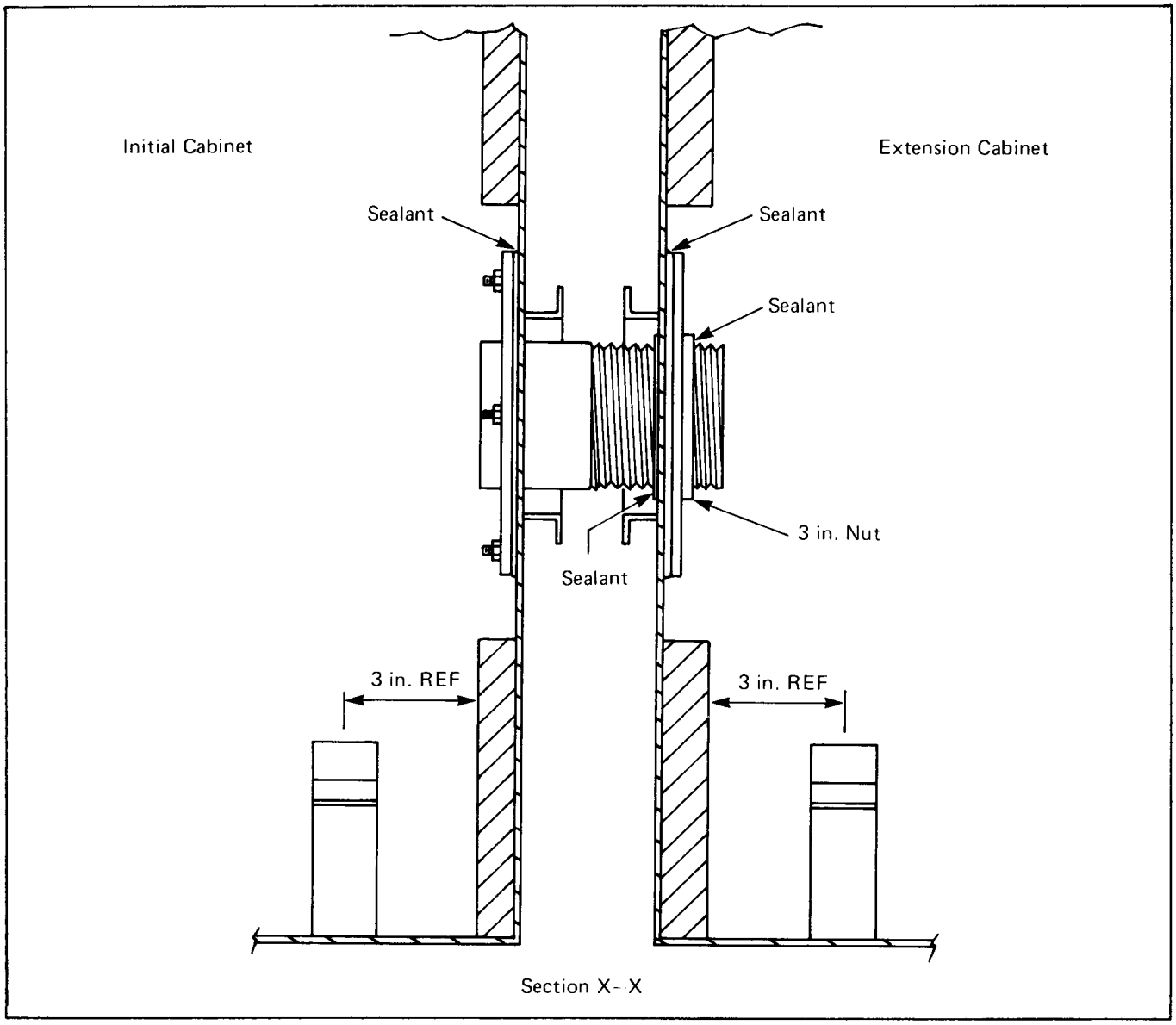


Fig. 21 — Duct Assembly

5. INSTALLING STUB CABLE

A. General

5.01 A 200-pair PIC cable is required to connect the cabinet cross-connect to a primary Jumper Wire Interface (JWI) (Fig. 22). The length of the interconnecting 200-pair stub cable is determined by the customer.

5.02 Open the right-hand door and hinged swing panel. Place the 200-pair stub cable through the cable gland located in the bottom right-hand portion of the cabinet. Pull about 10 feet (3 m) of cable into the cabinet.

5.03 Tighten the outer nut of the cable gland to compress the Neoprene bushing, thereby providing a weathertight seal.

B. Sheath Preparation

(1) Measure and mark the cable 1 foot (300 mm) from the floor of the cabinet or to the top edge of the bonding bracket.

(2) Remove the outer cable sheath and aluminum shield from the marker to the end of the cable, thus exposing the grease-impregnated paper wrap.

(3) To bond the cable, use the QCM2A bond clamp, and follow the instructions in Fig. 23(a) through (d).

(4) Using polyethylene tape, or equivalent, form a collar at the wire/sheath interface to prevent the pairs from shorting. The collar should extend from 1 inch under the outer cable sheath to 1 inch beyond it. Then, wrap the exposed paper for a distance of 2-1/2 feet (0.75 m) from the bond clamp with a half-lapped layer of 2 inch (50 mm) followed by two half-lapped layers of 1-inch vinyl tape. Complete the wrap with a half-lapped layer of 1-inch (25-mm) glass tape (Fig. 24).

(5) Feed the cable through the mounting bracket on the back of the hinged panel.

(6) Remove the exposed paper jacket, and clean the pairs of excess filling compound. A suggested cleaner is FILLED CABLE CLEANER distributed by Perkins Research, 6635 Independance Avenue, Conalda Park, California 19303, USA.

(7) Strip the outer jacket and aluminum shield from the 26-gauge 100-pair protector stubs. Cut all stub cable pairs to a convenient working length and splice the 26-gauge stub cables to the 200-pair PIC cable in accordance with local instructions. (Fig. 25 and 26).

(8) Attach braided bonding ribbon from the protector blocks to the bond clamp and ground bar as shown in Fig. 26.

C. Terminating Stub Cables

(1) Remove the cable jacket from the 24-gauge stub cables, and route the exposed cable pairs through the panel to the cross-connect field as shown in Fig. 27.

(2) Terminate the pairs as shown in SD7209 Section G.

(3) Using 24-gauge jumper wire, jumper between the distribution and equipment pairs according to local procedures.

6. SYSTEM GROUND

6.01 Run a No. 6 tinned-copper wire directly from the ground clamp of the main disconnect switch, through the clamp provided in the floor of the equipment compartment, to a ground rod according to local instructions.

6.02 Run a No. 6 tinned copper wire from the ground bar to the ground rod, through the gland provided in the floor of the equipment compartment, according to local instructions. Specification for cabinet ground-to-earth resistance is $\leqslant$25 ohms.

7. CIRCUIT PACK INSTALLATION

7.01 Install circuit packs as described in 363-2011-206.

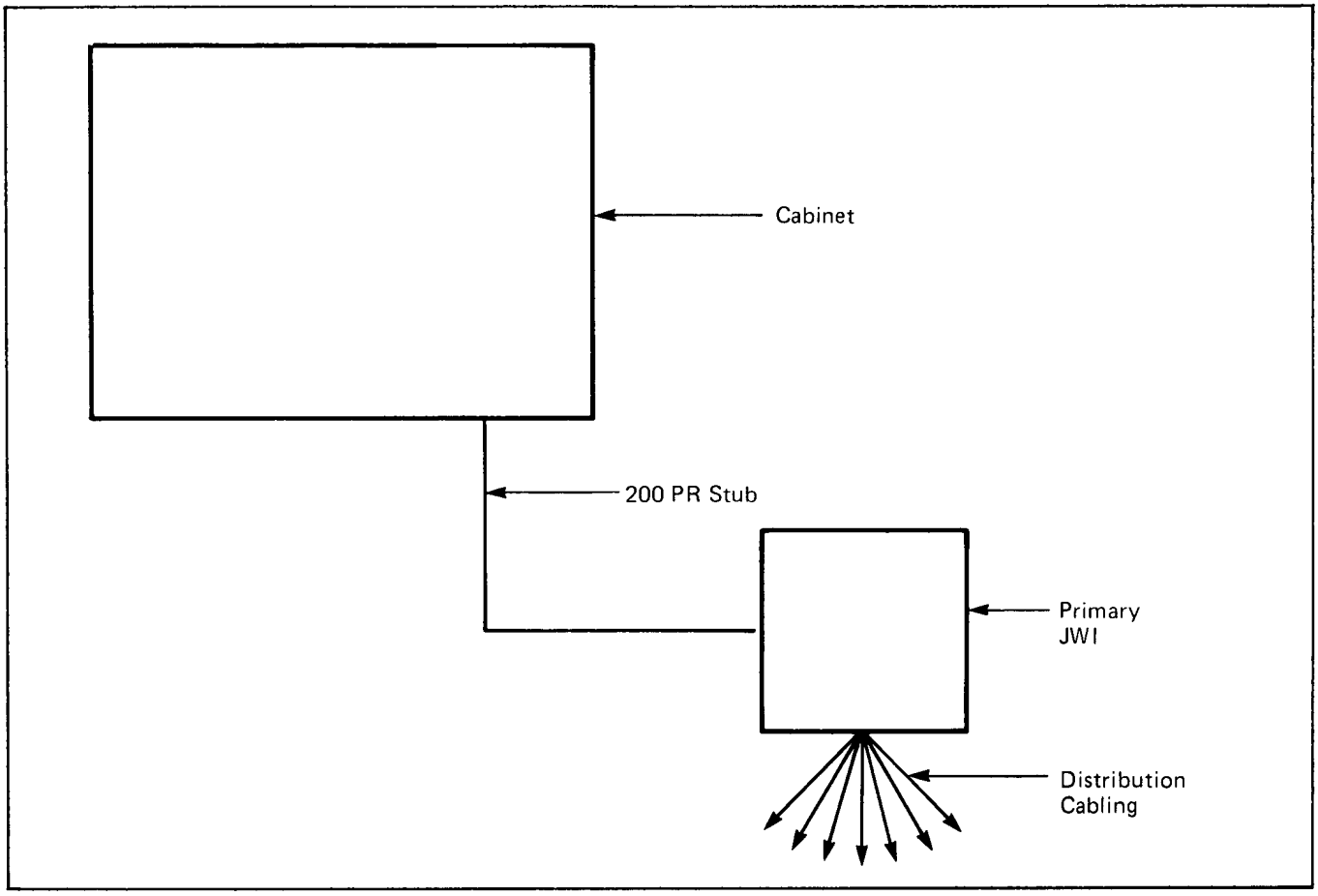


Fig. 22 – Cabinet – Primary JWI Schematic

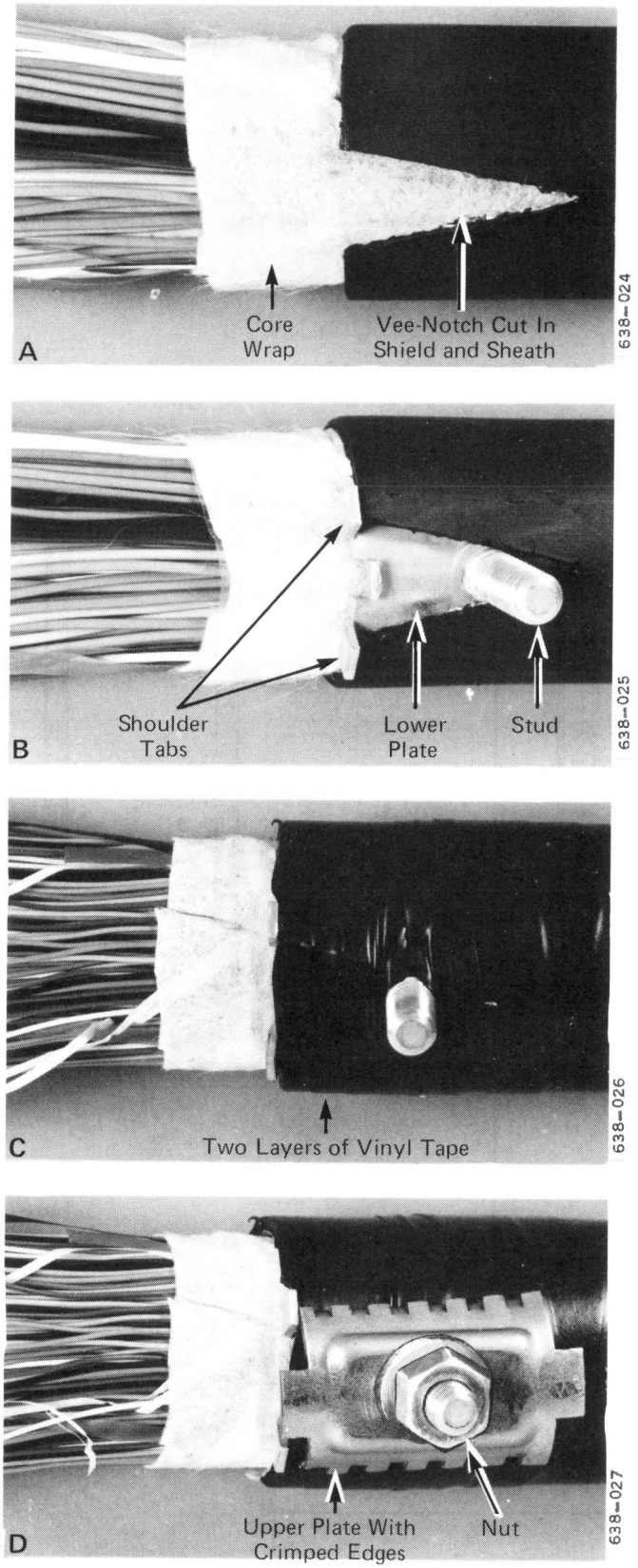


Fig. 23 — QCM2A Installation

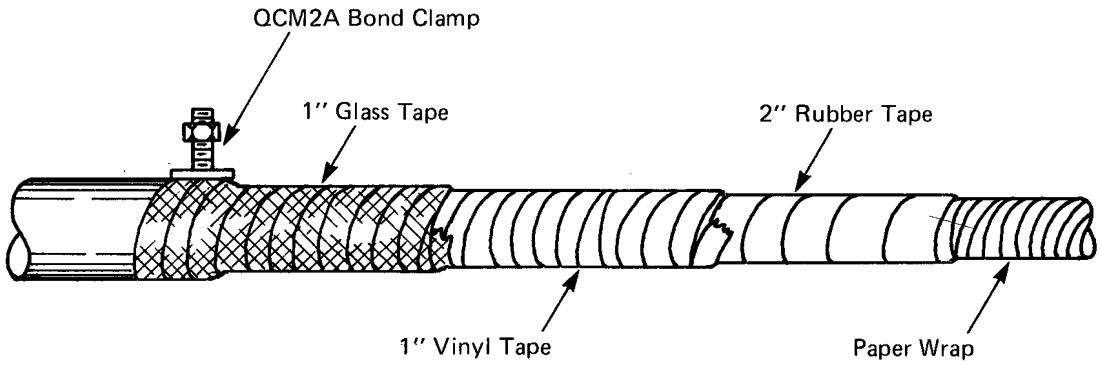


Fig. 24 — Wrap Cable

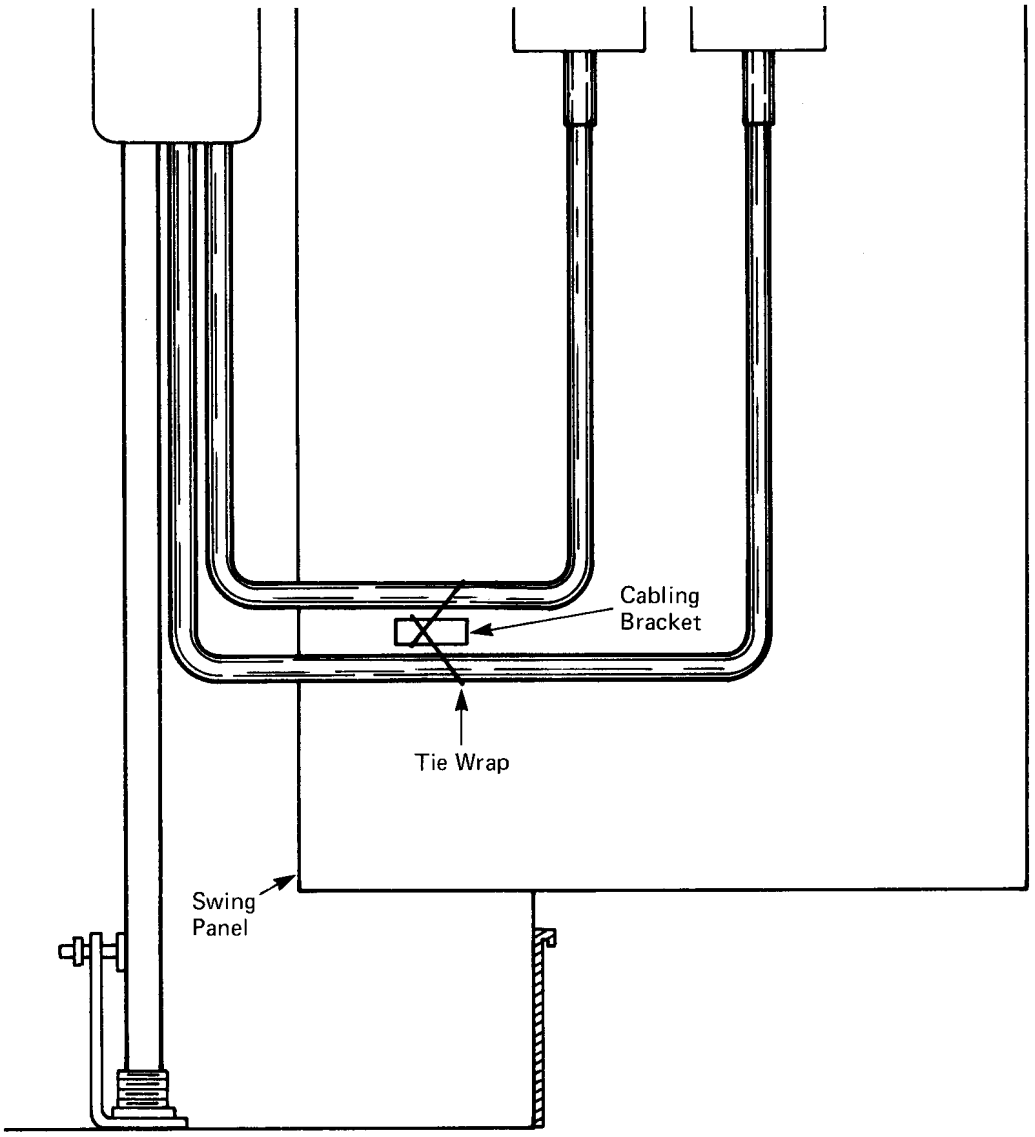
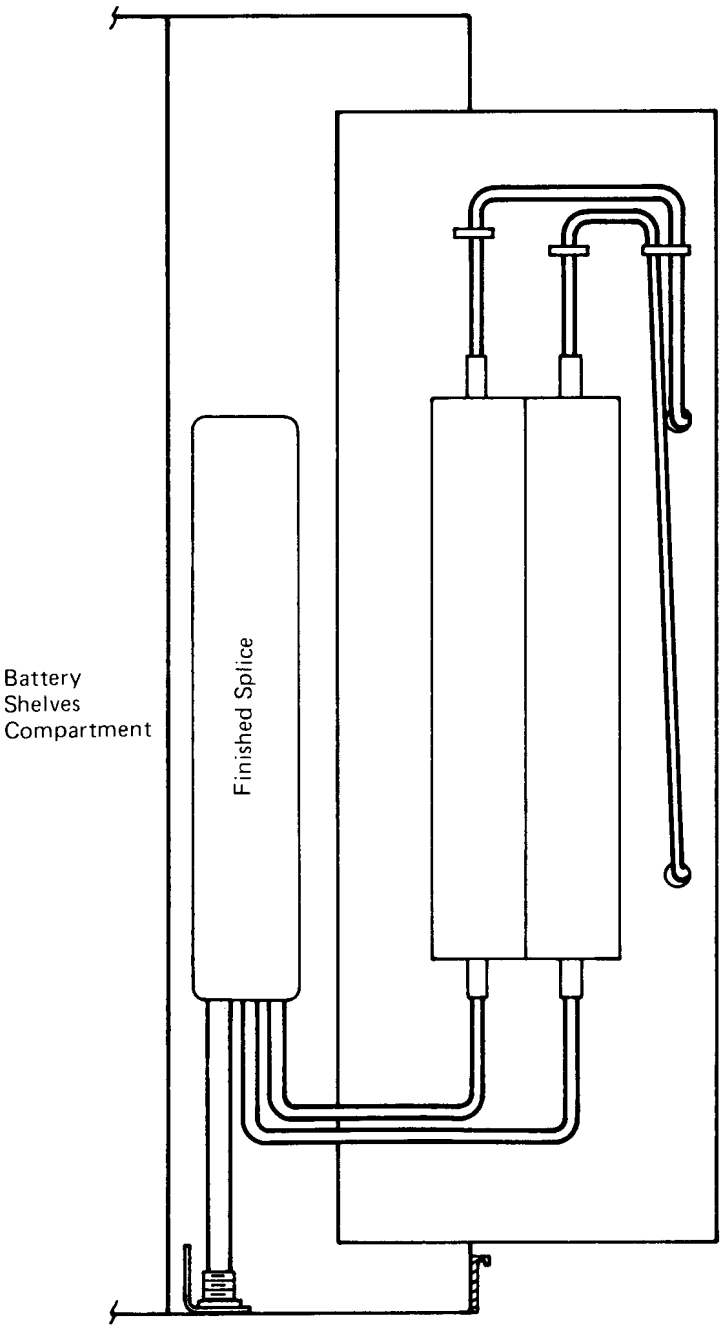


Fig. 25 — Securing Cable with Tie Wraps



Note:

Suggested method only. Install splice in accordance with local standards.

Fig. 26 — Splicing and Bonding

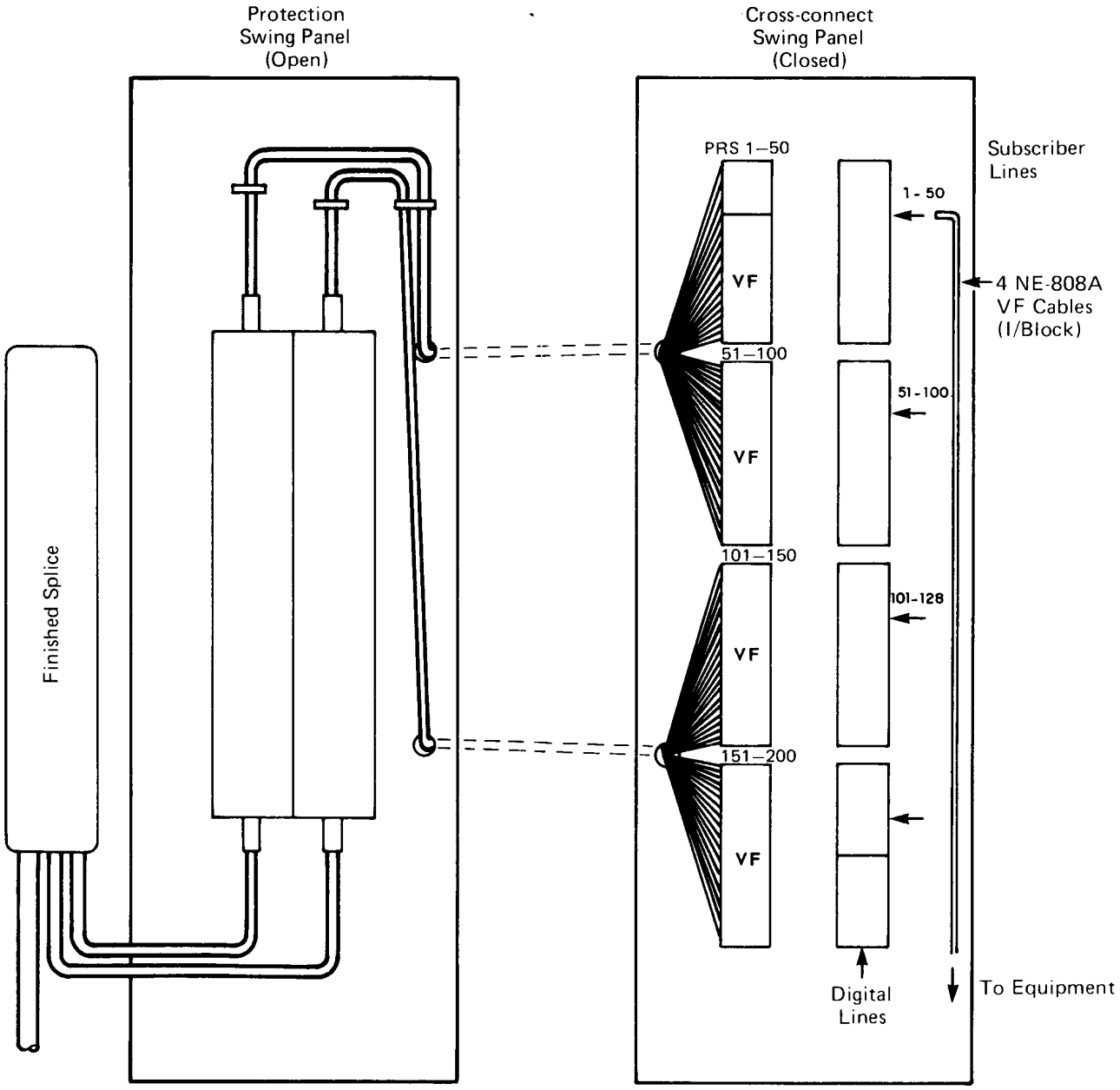


Fig. 27 – Cable-Pair Routing

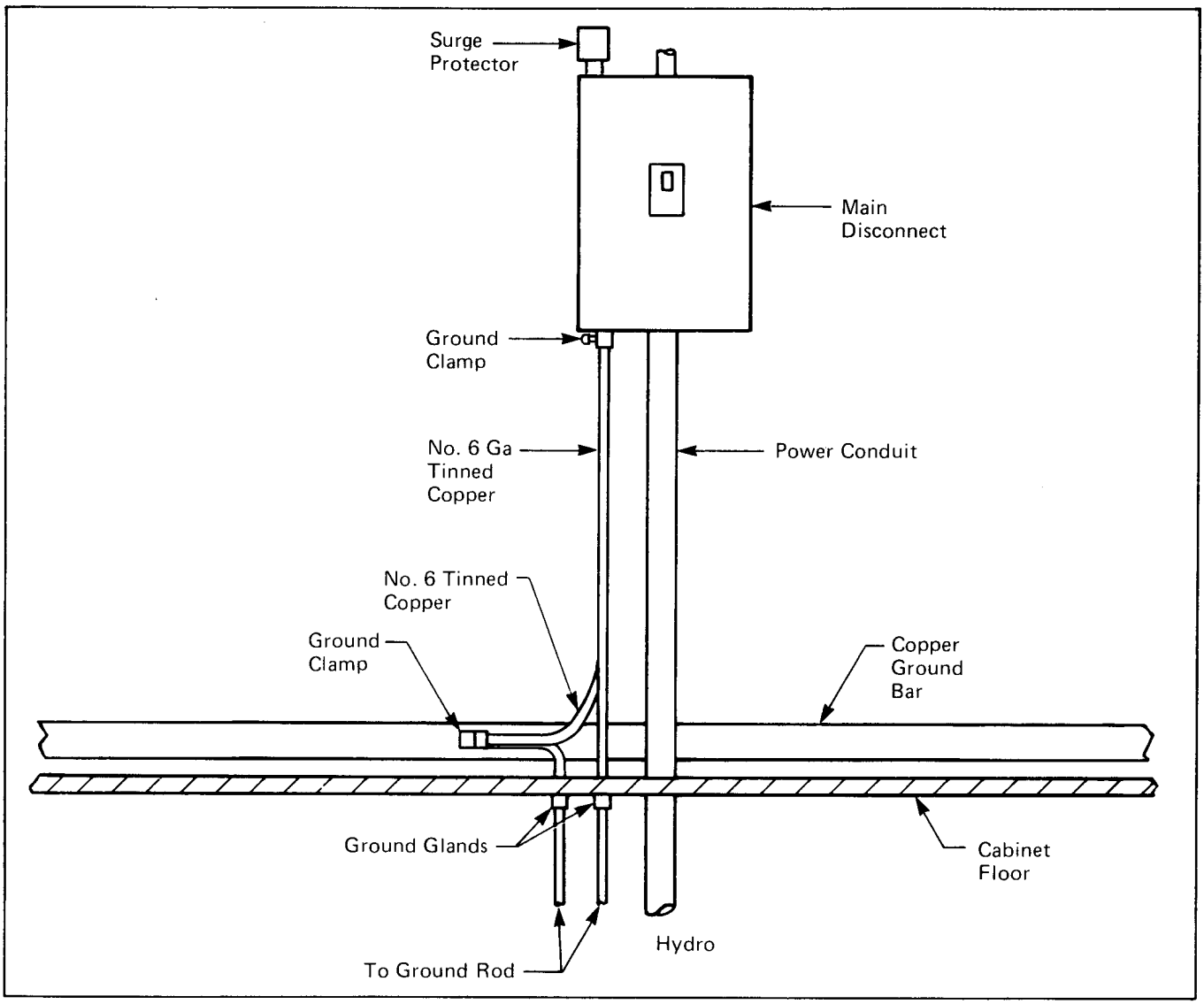


Fig. 28 — Branch Ground to Main Ground Connection

8. MAINTENANCE

8.01 All maintenance operations on the cabinet are performed by the customer's maintenance crew or by contracted personnel.

Note: A tent or tarpaulin should be erected over the front of the cabinet, if the forseeable amount of work at the cabinet requires it to be open for a long time.

8.02 The parts that require maintenance are listed in Table A under the following headings:

(a) *Maintenance Item* — part that requires maintenance,

(b) *Operation* — what is to be done,

(c) *Interval* — the recommended maintenance interval.

8.03 Detailed maintenance instructions should be provided by the customer's maintenance engineering department.

TABLE A
RECOMMENDED CABINET MAINTENANCE

MAINTENANCE ITEM	OPERATION	INTERVAL
(1) Fans	Bridge thermostats to check fan operation, if fans are not already running.	12 months
(2) Heaters	Bridge thermostats to check heater operation if not already running.	12 months
(3) Air Filters	Clean Replace	12 months 2 years or as required by local conditions
(4) Door Alarms	Check operation by depressing and releasing.	12 months
(5) Batteries	Replace	5 years or as required
(6) Door Hinges	Lubricate	as required
(7) Paint Finish	Brush or Spray with SICO type 883 (001-1400) polyurethane paint, Montreal, Que.	as required
(8) Fan Inverter	Check fuses and replace if necessary. Unplug fan inverter power cord — left-hand fan should continue to run, if already running. If not, bridge the thermostat to complete this test. If not, report to maintenance engineer.	12 months
(9) System Ground	Check connections and ground resistance ($\leqslant$25 Ω) per local instruction.	per local instruction