

Appendix CC

Rack and Cabinet Installation Instructions

ETS 300 119 Rack and Cabinet Mechanical Structure

This chapter refers to the structures rack and cabinet; the difference between them is that the cabinet is fitted with a door, the rack is not. In the following description the term rack encompasses both unless specifically stated otherwise. The rack is a sturdy structure in which are assembled the sub-racks lodging the equipment units. It has been manufactured in accordance with part 2 and part 3 of Rec. ETS 300119 European Telecom. Standard for Equipment Construction Practice.

The mechanical characteristics of the rack are (Fig. CC-1) :

Dimensions

- ◆ *Height 2200mm;*
- ◆ *Width 600mm;*
- ◆ *Depth 300mm.*

Weight

- ◆ *59Kg. (empty rack)*
- ◆ *71Kg. (empty cabinet)*
- ◆ *72Kg. (empty screened cabinet)*

The rack is made up of the following mechanical parts:

1. One top element, which is bolted to the vertical supports. The top element consists of a pressed zinc-plated steel section, varnished on the outer surface. On the four uppermost corners of the top element lifting eye-bolts are screwed in threaded holes.
2. One base element, which is bolted to the vertical supports. The base element consists of a pressed zinc-plated steel section, varnished on the outer surface.
3. Four vertical supports, which are fastened to the inside corners to provide further strength for the rack. The two front vertical supports bear square holes (9.6mm) for fixing the equipment subracks.

The square holes are spaced 25mm apart and are numbered 1 to 83 from base to top. All four supports also bear holes (\varnothing 4mm) for fixing the partitioning strips (item 5).

4. Two side panels and one rear panel, which are bolted together.

5. Eight partitioning strips to be assembled (four on each side) on the vertical supports. The strips enable the connecting cables to be arranged neatly along the rack sides.

Optionally, one plastic duct for housing the optical fibre cables can be installed alongside the front left-hand vertical support.

6. Rack Alarm Unit, which is assembled in a compartment at the front of the top element. The unit contains circuits for visual rack alarms and for rack alarm re-transmission.
7. Optional door, which is fitted with two press-to-close/-open devices and a lock with key.

The top and base elements have three wide openings, one central and two side openings. The side ones are used for exchange cables entry. If any opening is not used a grid is fitted.

The rack can be fixed to the floor by means of expanders inserted in the two holes in the base element. Four screws in the element provide an adjustment to compensate for any floor unevenness of up to 25mm.

At the top of the right vertical support is located the rack ground lug. All the four vertical supports, the base element and the top element are electrically connected to ensure ground continuity.

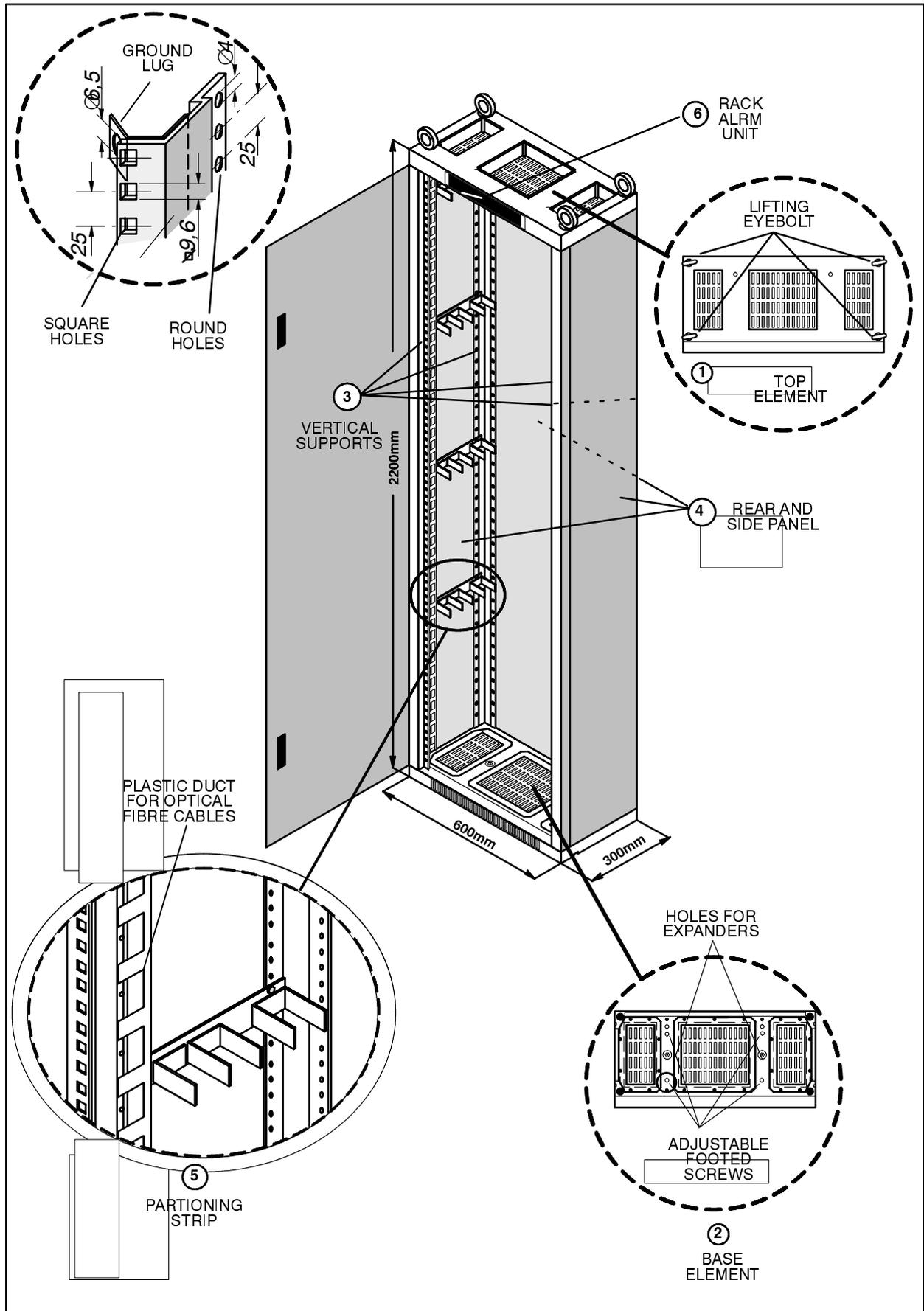


Fig. CC-1 Dimensions and Mechanical Structure of the rack

Rack and Cabinet Installation

This paragraph describes methods for installing the rack in telephone exchanges with pre-arranged fixing structures (2200 or 2600mm high), in telephone offices with standard or raised floors or in subscriber premises.

Installation Tools

To carry out the rack installation, the following tools are necessary (Fig. CC-2) :

- ◆ 1 Hammer drill;
- ◆ 2 $\varnothing 20$ and $\varnothing 9$ Widia drills;
- ◆ 3 Box socket spanner;
- ◆ 4 Box spanner;
- ◆ 5 Square;
- ◆ 6 Plumb line;
- ◆ 7 Tracer;
- ◆ 8 Allen spanners (CH3 and CH6 type);
- ◆ 9 Saw fitted with suction filter for sawdust (only for raised floors);
- ◆ 10 Phillips screwdrivers (N3 and N4 type);
- ◆ 11 Blade screwdrivers (N2, N3 and N4 type).

Installation Accessories

The following accessories are necessary for installing the rack in offices or exchanges where no special extension elements are needed (Fig. CC-3) :

◆ **Fixing plate – AD,**

for fastening rack to supporting plate.

◆ **Supporting plate,**

- for fastening fixing plates to wall (not supplied) (Fig. CC-5)

- for back-to-back mounting (not supplied) (Fig. CC-10) .

◆ **Alignment bar – BA w/ Gudgeon pins – SR**

used as reference for positioning and aligning rack on floor.

◆ **Stainless Steel Screws and Washers,**

for fastening fixing plates to rack and rack to alignment bar.

◆ **Expander – M6,**

for fastening alignment bar to floor (not supplied).

◆ **Expander – M10,**

for fastening rack base element to floor and supporting plate to wall (not supplied).

Mentioned items are included in the appropriate 'rack installation set (Fig. CC-3) .

(Fig. CC-4) shows the characteristics of the M6 and M10 expanders for concrete floors.

NOTE (1) *When installing the ETSI rack in exchanges with 2600 mm high fixing structures, an extension element is necessary to be assembled on top of the ETSI rack. The extension element forms part of the ETSI rack Fixing Set.*

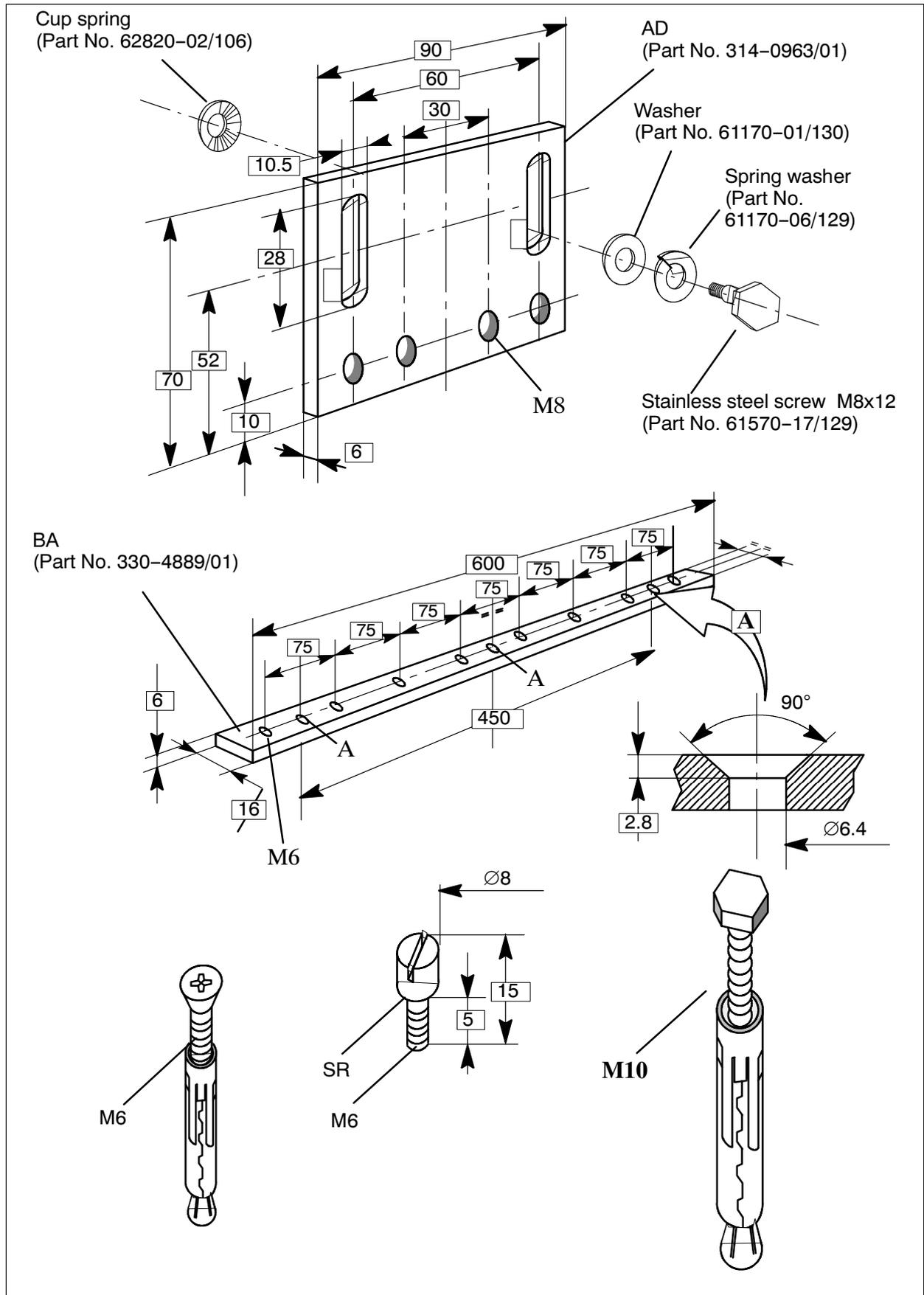


Fig. CC-3 Installation accessories

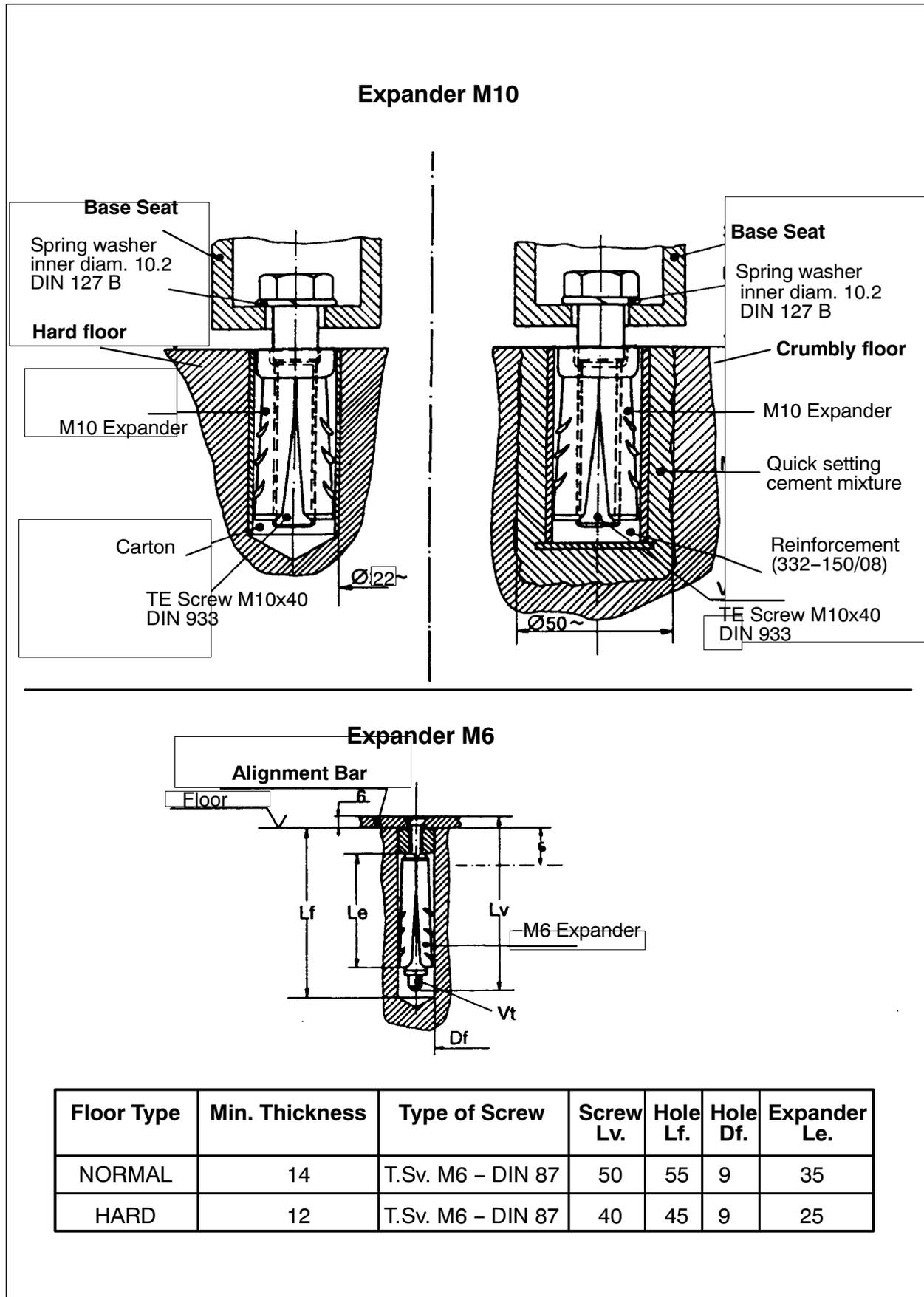


Fig. CC-4 Expander characteristics

Rack (2200x600x300) Installation

Wall and Standard Floor Mounting (NO TAG)

Proceed as follows:

1. Locate and mark the position on the wall for the two holes for the expanders which will fasten the supporting plate in position at 2227mm above the floor level (Fig. CC-5).

Drill the two holes.

2. Remove the expander body from each expander bolt and insert the two bodies into the holes in the wall.

Fit the expander screws into the holes (end holes) in the supporting plate (Fig. CC-7).

Place this against the wall and fasten it.

3. Fit two 6x10mm screws with 6.4x11mm spring washers into the holes at the back of the rack top and into two holes (odd or even) of each fixing plate (Fig. CC-7).

Tighten the screws.

4. Using the plumb line and the square locate and mark on the floor the positions for the fixing holes 'A' for the rack base and 'B' for the alignment bar, if required (Fig. CC-5).

5. Drill the holes of a suitable diameter depending on the floor hardness (Fig. CC-4) ; in the case of a crumbly floor the hole must be larger (about 50mm) so that it can be filled with quick-setting cement mixture in which M10 expander can be embedded.

6. Then fix a sling to the four lifting eyes located on the rack top and, by means of a hoisting device, lift the rack and place it back on the floor so that the holes in the rack base are directly above the holes in the floor.

7. Insert two 8x12mm screws into the slots of the fixing plate and tight them partially (Fig. CC-7); similarly, insert the expansion bolts into the holes of the rack base and partially screw them in the expanders (Fig. CC-8).

8. If the alignment bar has been arranged, the gudgeon pins must be inserted in the relevant holes located in the rack base.

9. Using the plumb line, check that the rack is perfectly vertical and, if required, suitably adjust the foot screws in the rack base using the adjustment screws (Fig. CC-8).

10. Tighten all screws completely.

Wall and Raised Floor Mounting

Proceed using the same method as for the previous type of fixing.

Where the structure requires that the cables pass through the inter-space of the raised floor, it is necessary to make two holes (200x105mm) in the floor (Fig. CC-9) through which the connection cables will pass.

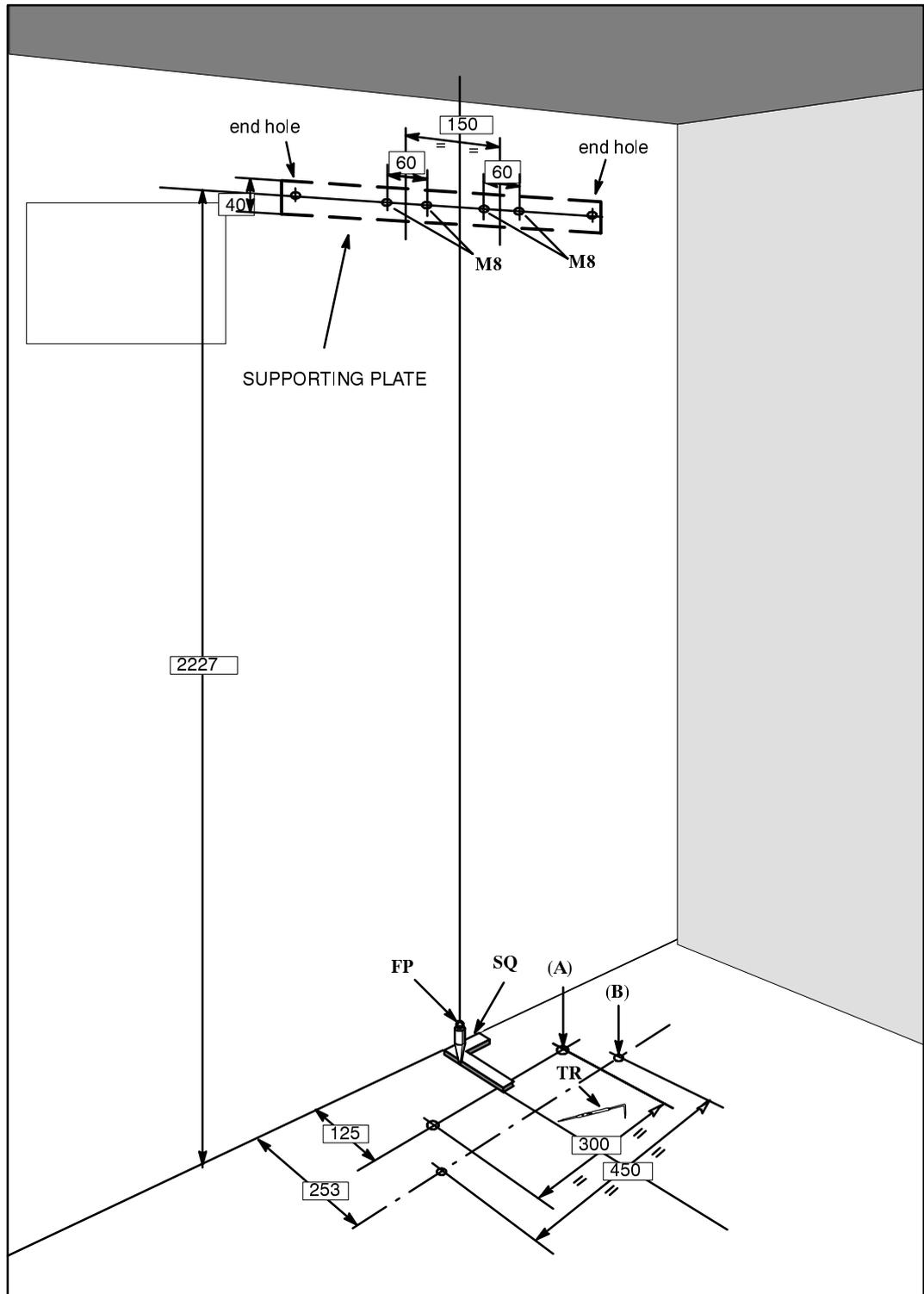


Fig. CC-5 Rack wall mounting – location of holes

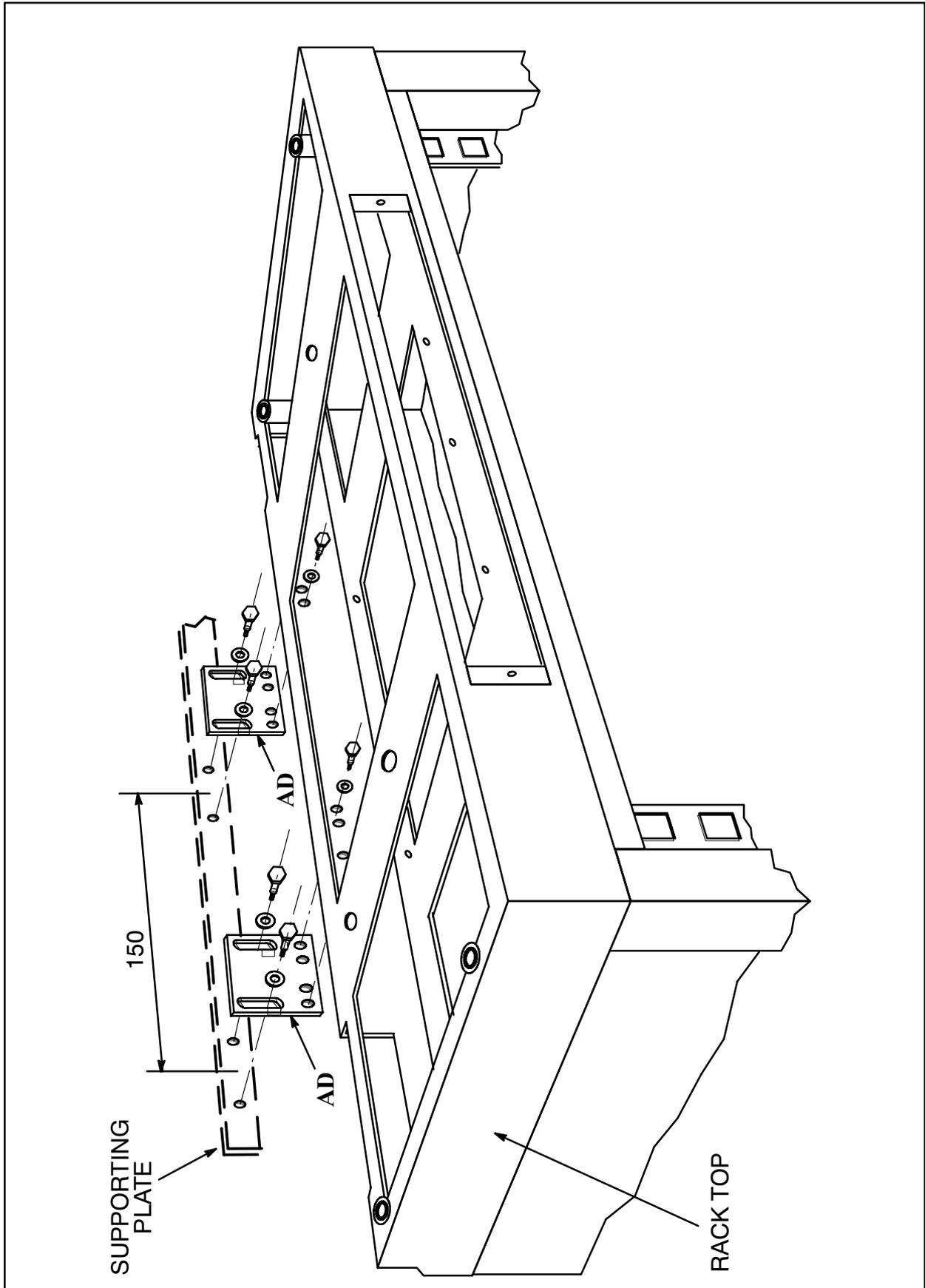


Fig. CC-6 Rack wall mounting – supporting plate and rack top element

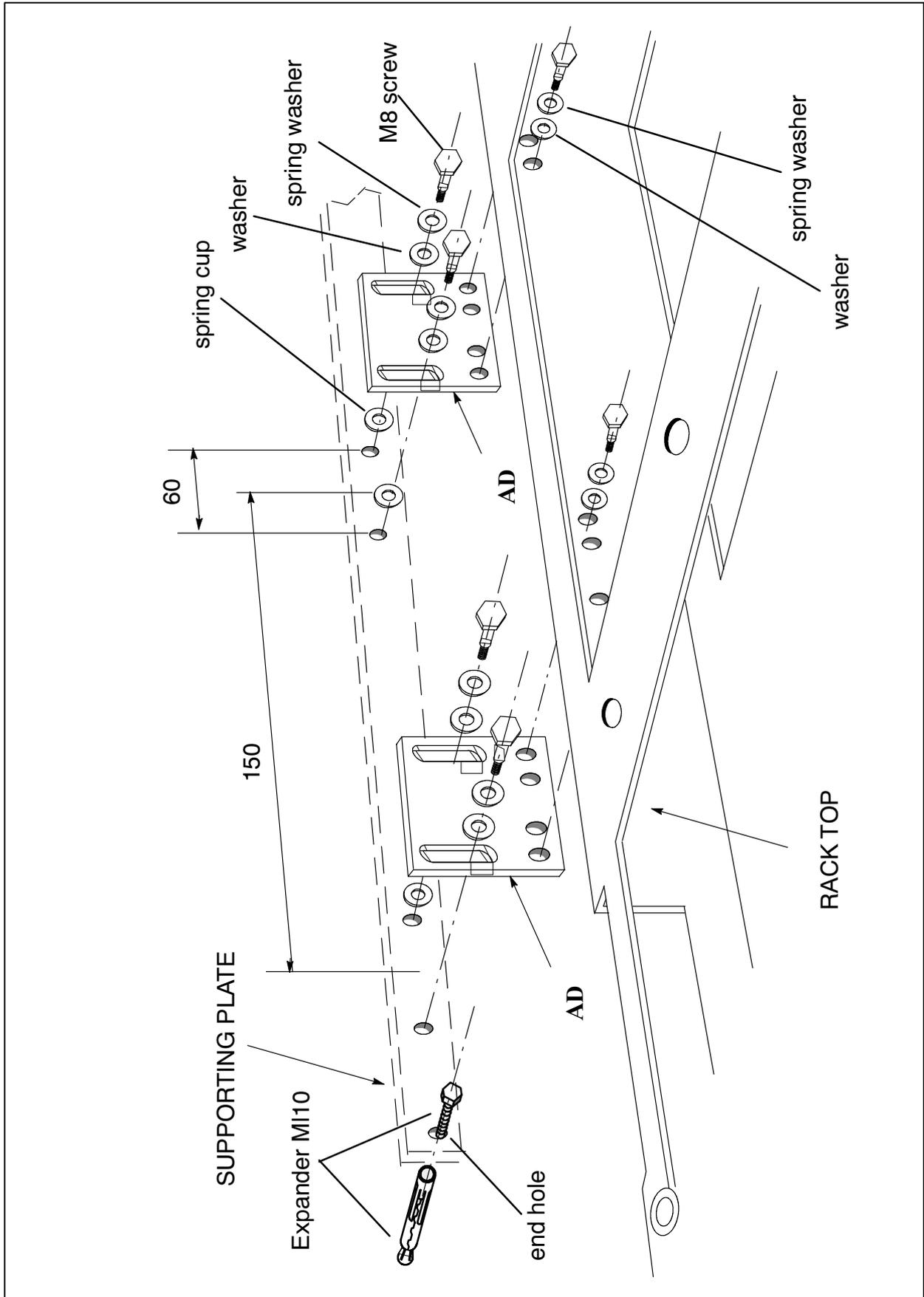


Fig. CC-7 Exploded view of wall fixing

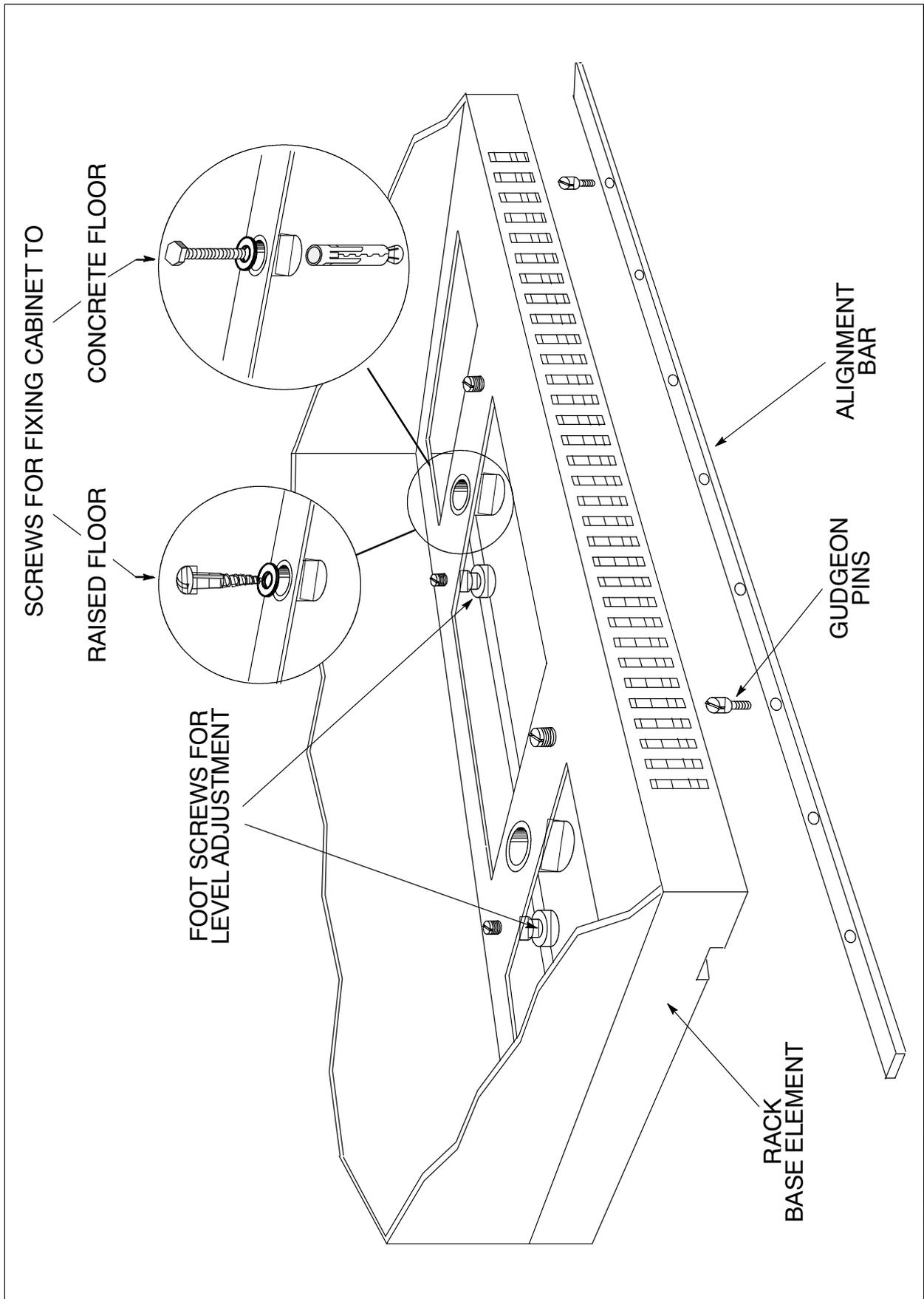


Fig. CC-8 Rack mounting - view of rack base element

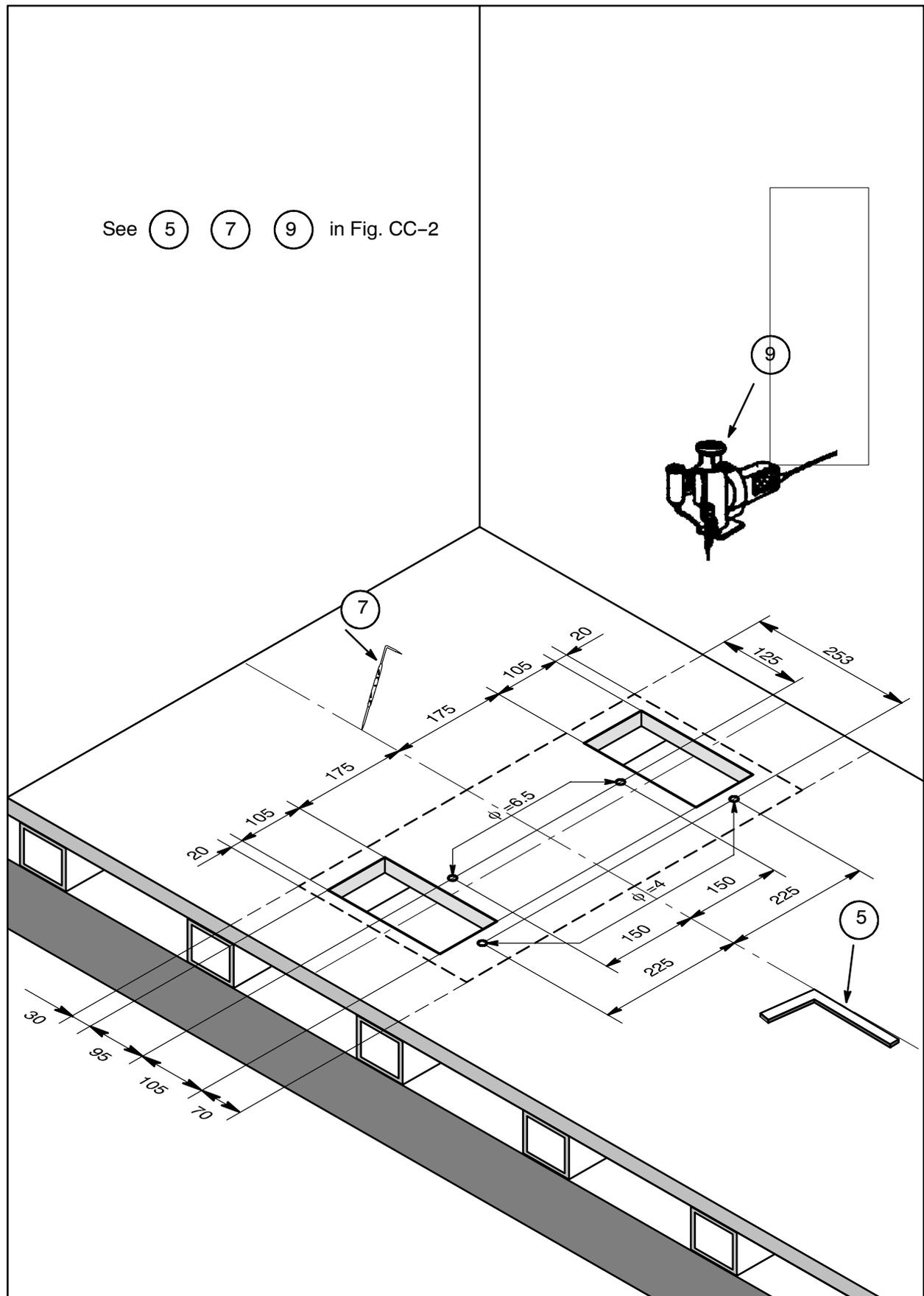


Fig. CC-9 Rack mounting–location of holes on raised floor

Standard Floor Mounting

Proceed as follows:

1. Execute steps 4, 5 and 6 under *Wall And Standard Floor Mounting*.
2. Insert the expansion bolts into the holes of the rack base element and partially screw them in the expanders.
3. If the alignment bar has been arranged, the pins must be inserted in the relevant holes located in the rack base element.
4. Using the plumb line, check that the rack is perfectly true to vertical and, if required, suitably adjust the feet in the rack base element (Fig. CC-8).
5. Tighten all screws completely.

Raised Floor Mounting

Proceed using the same method as for the previous type of fixing.

Where the exchange structure requires that the exchange cables pass through the inter-space of the raised floor, it is necessary to make two holes (200x105mm) in the floor through which the connection cables will pass (Fig. CC-9).

Back-to-Back Mounting

Proceed as follows:

1. Using the plumb line and the square locate and mark on the floor the positions of holes A for fixing the racks and holes B for installing the alignment bar, if required (Fig. CC-5).
2. Fix an appropriate sling to the four lifting eyes on top of racks and, by means of a lifting device (e.g. hoist), place the racks in the designated space on the floor and arrange them back-to-back.
3. Place the supporting plate between the top elements of the two back-to-back racks making sure that the holes of the top element and supporting plate are perfectly aligned (Fig. CC-10). The supporting plate has four threaded holes for each rack. Use the even holes for one rack and the odd ones for the other.
4. Fit the four 6x10mm screws with 6.4x11mm spring washers into the holes at the back of the rack top and into two holes (odd or even) of the supporting plate.
5. If the alignment bar has been arranged, the gudgeon pins must be inserted in the relevant holes located in the rack supporting base.
6. Using the plumb line, check that the racks are perfectly true to vertical and, if required, suitably adjust the feet in the rack base elements. (Fig. CC-8).
7. Tighten all screws completely.

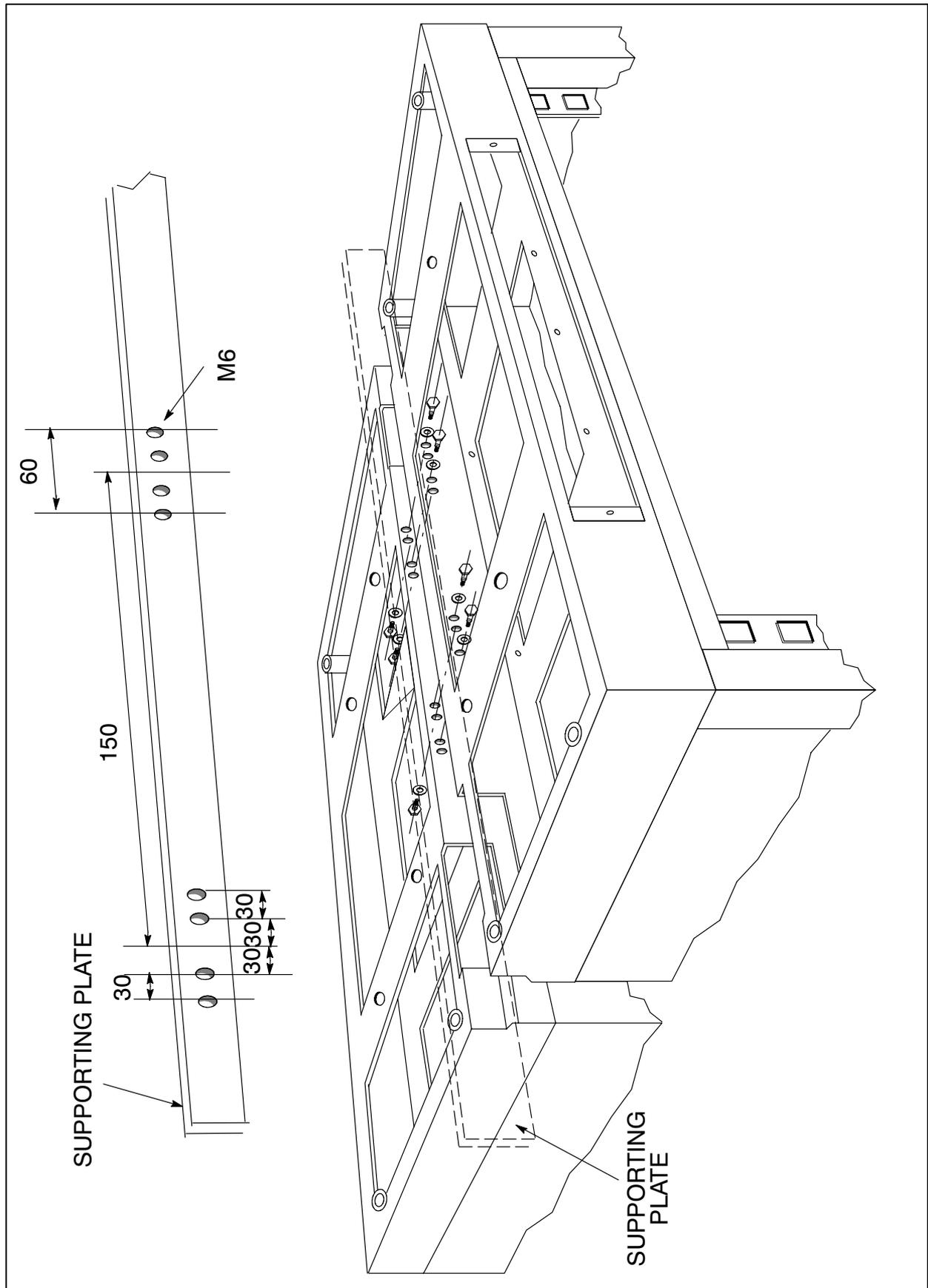


Fig. CC-10 Back-to-back mounting – view of top elements and supporting plate

Exchange Structure Mounting

2200mm High Structure

Proceed as follows:

1. Fit two 6x10mm screws with 6.4x11mm spring washers into the holes at the back of the rack top and into two holes (odd or even) of each fixing plate (Fig. CC-12).
2. Refer to steps 4 to 10 of the *Wall And Standard Floor Mounting* procedure.

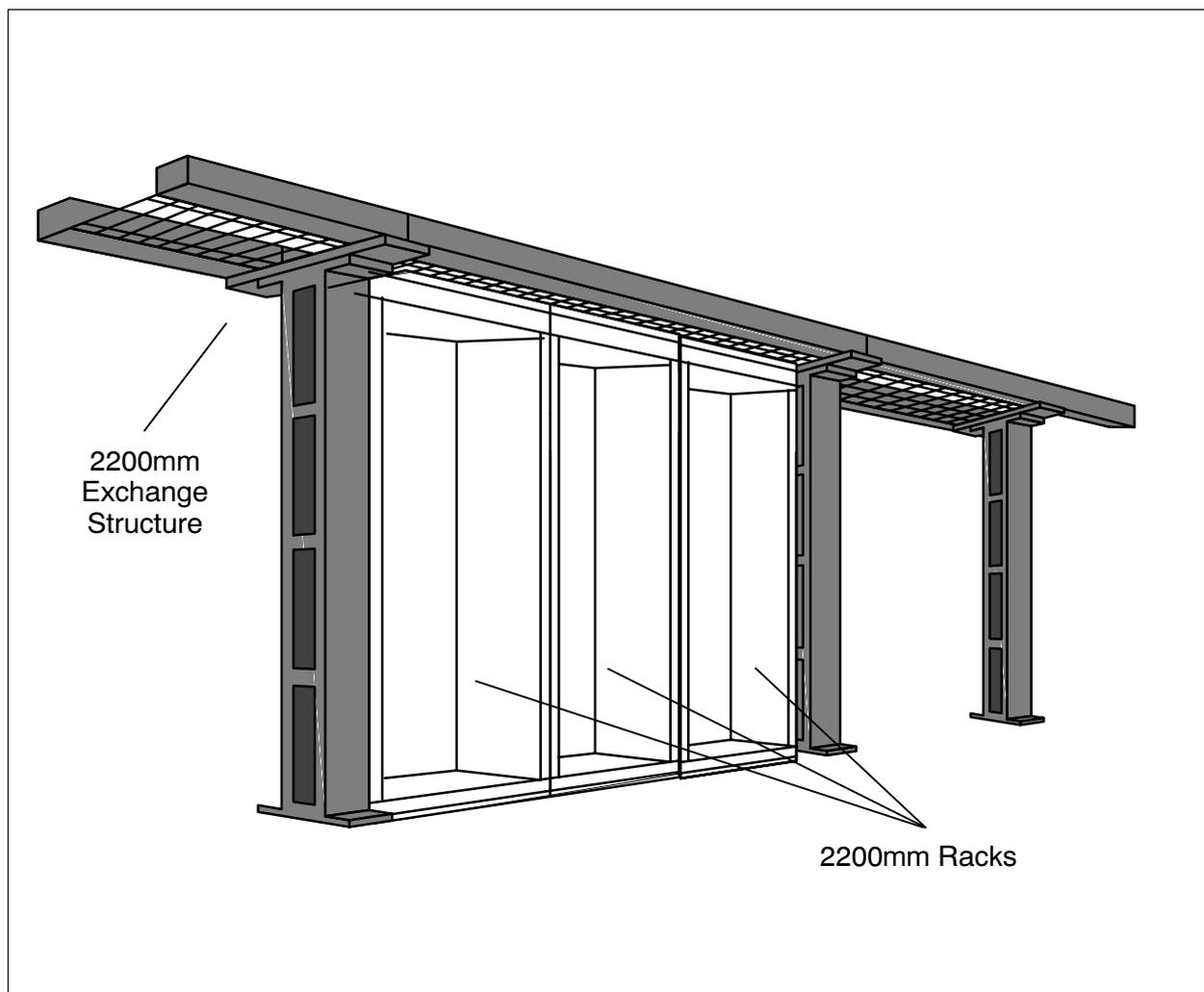


Fig. CC-11 View of racks installed in an exchange with 2200mm structures

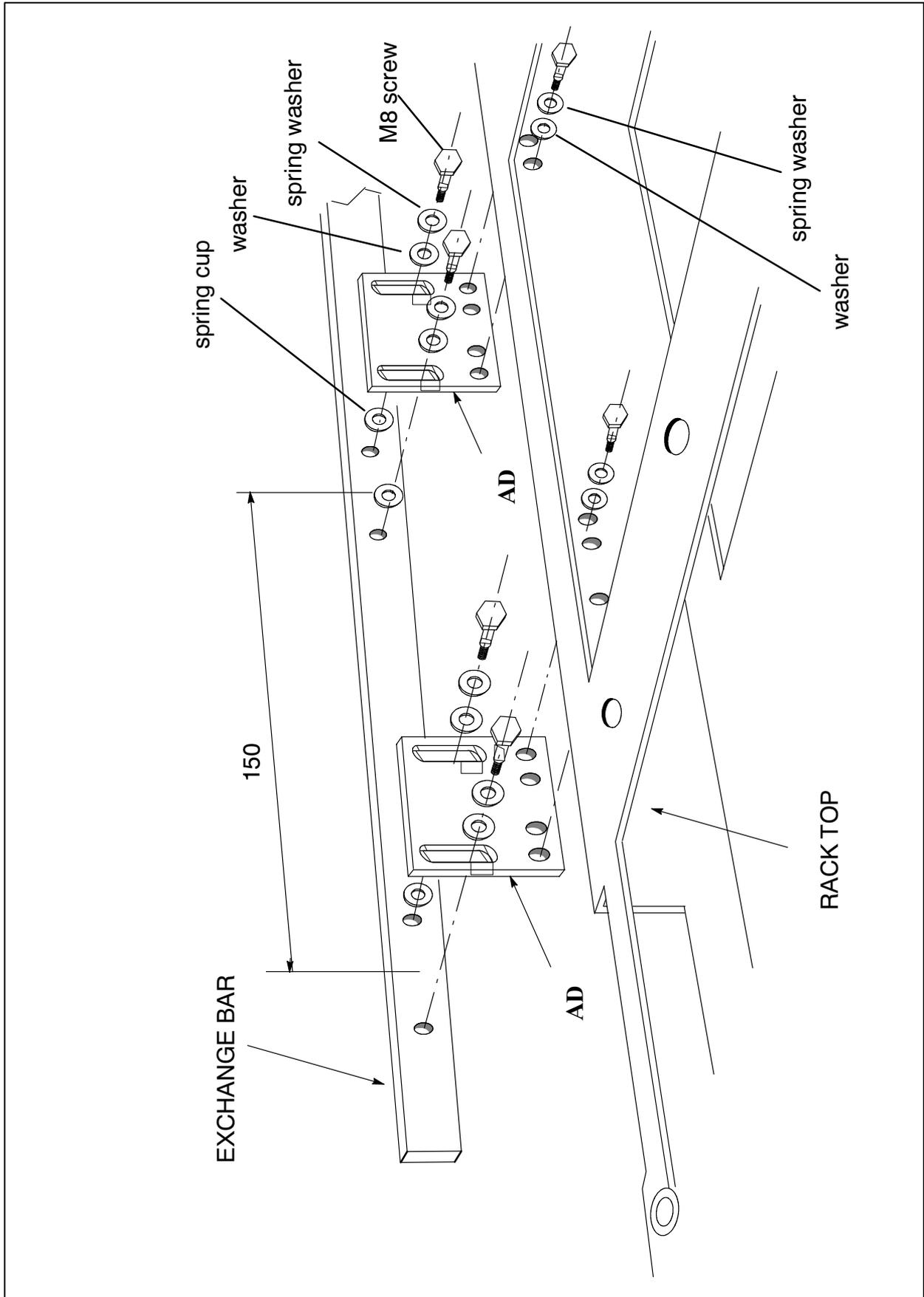


Fig. CC-12 Fastening the rack to the exchange bar

2600mm High Structure

Proceed as follows:

1. Remove the eye-bolts from the top element.
2. Place the extension element on the rack top and using the four screws provided with the element, fasten it in position (Fig. CC-14).
3. Fit four (two pairs) 6x10mm screws with 6.4x11mm spring washers in the slot (\varnothing 10mm: length 54.8mm) on the top rear section of the extension element. Insert each pair of protruding screws in the holes (odd or even) of each fixing plate and tighten the screws (Fig. CC-15).
4. Execute to steps 4 to 10 under *Wall And Standard Floor Mounting*

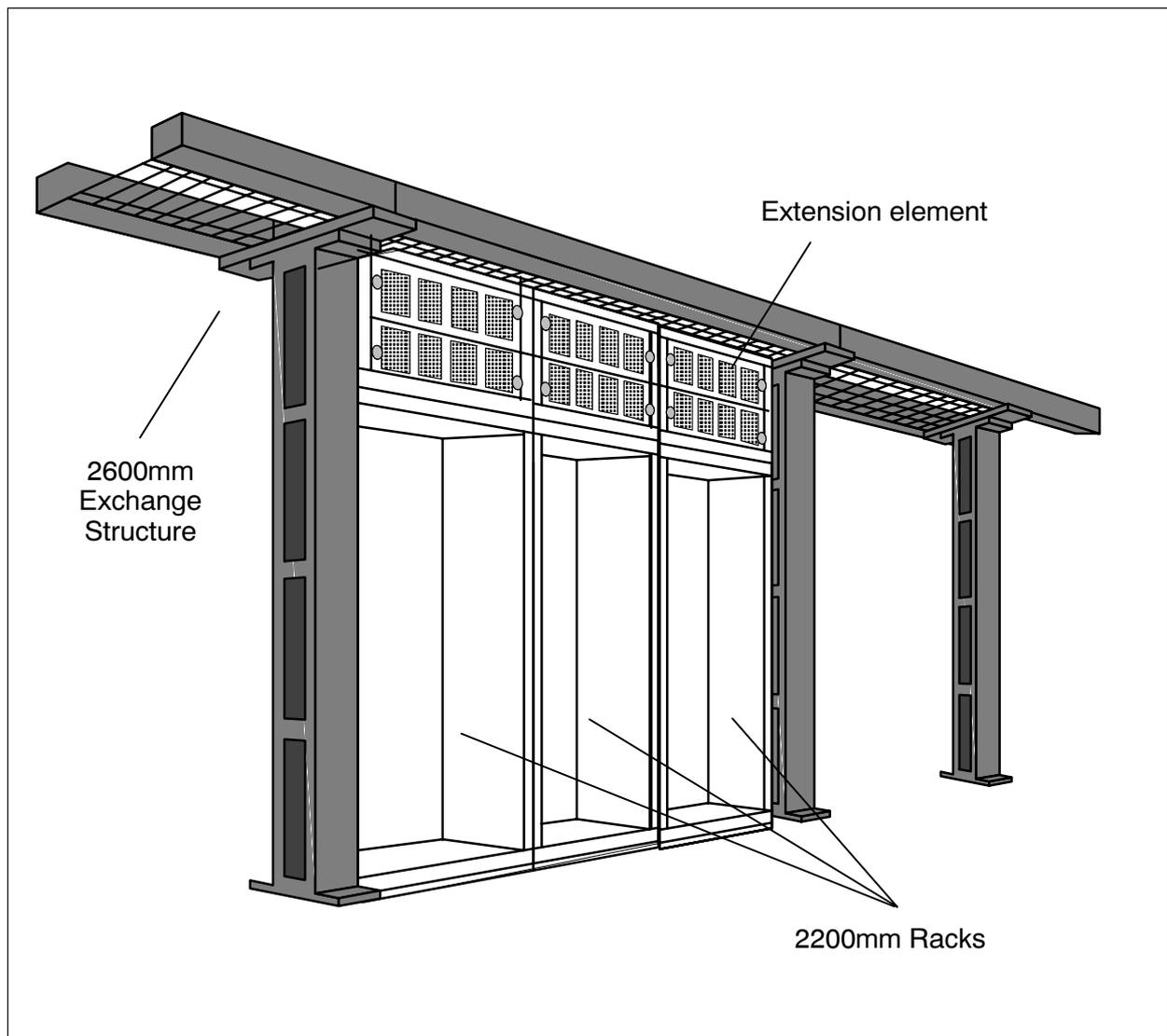


Fig. CC-13 View of racks installed in an exchange with 2600mm structures

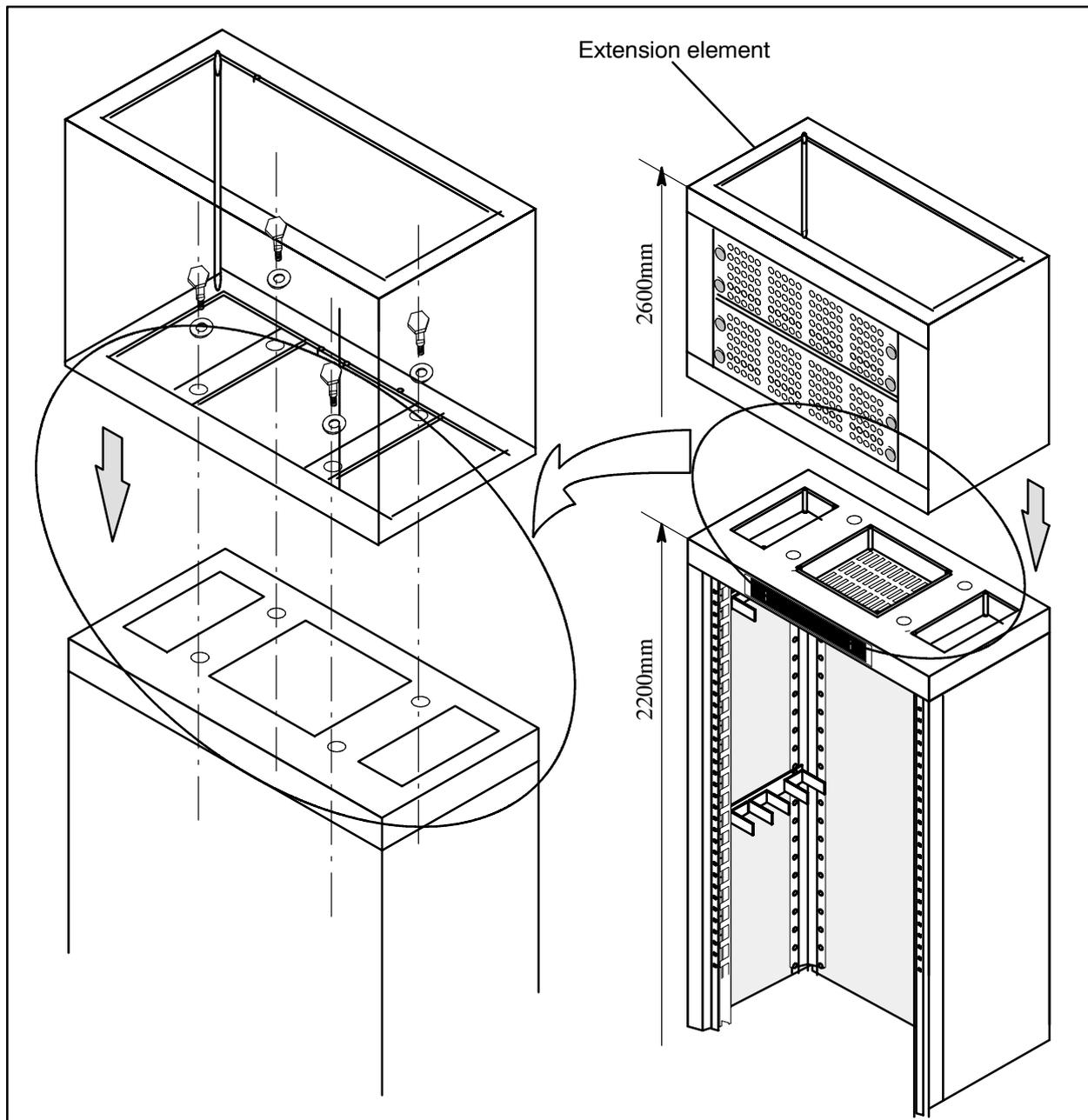


Fig. CC-14 Fastening extension element to rack top

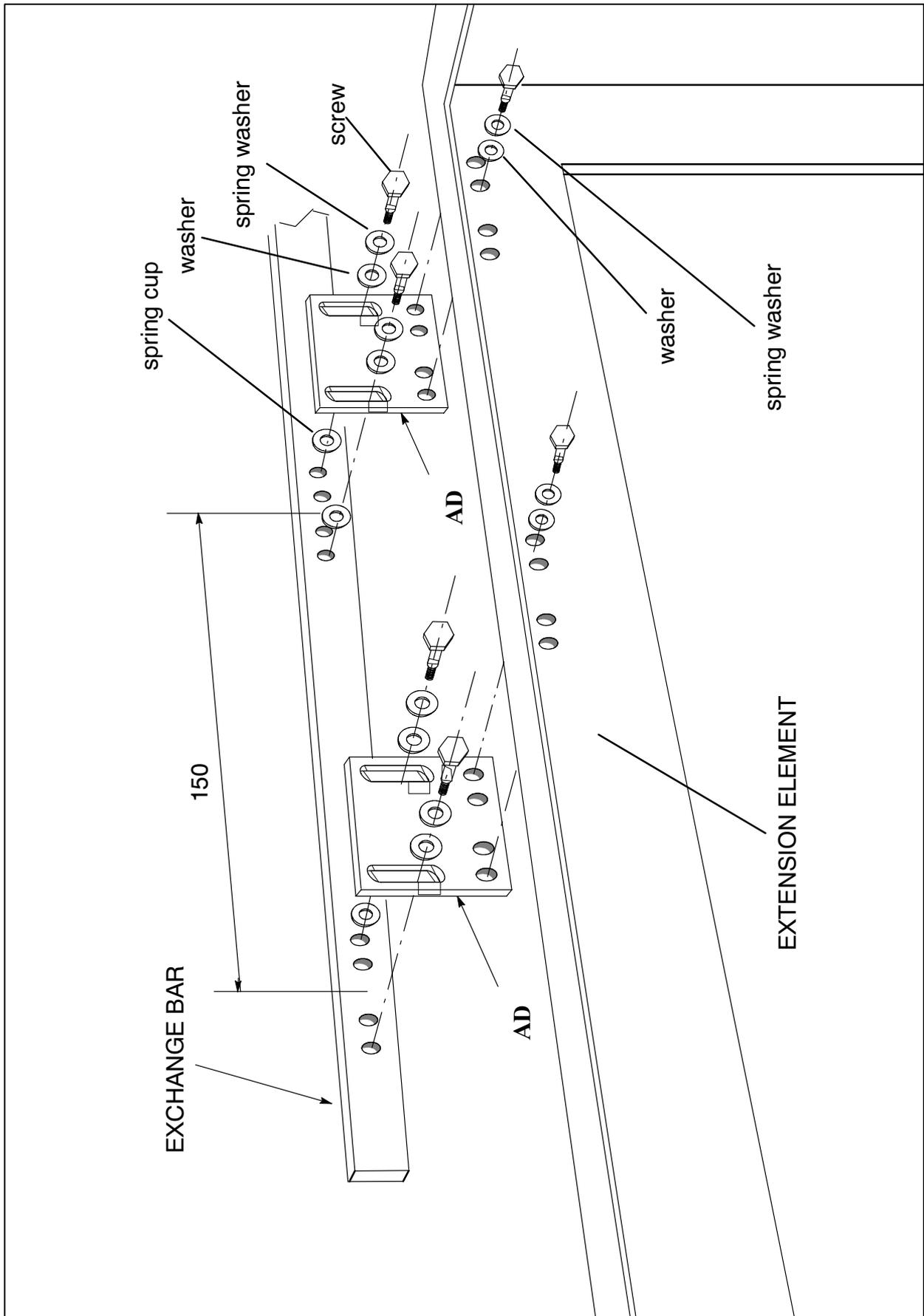


Fig. CC-15 Fastening rack extension element to exchange bar

Fastening Partitioning Strips

Proceed fixing the partitioning strips to the left and right side of rack. Fix the first partitioning strip a few centimeters below the rack top, fix the others just above the top of each subrack (Fig. CC-16).

————— The Chapter **Subrack Installation** contains information on the exact mounting position for the subracks and, therefore, the positions for partitioning strips.

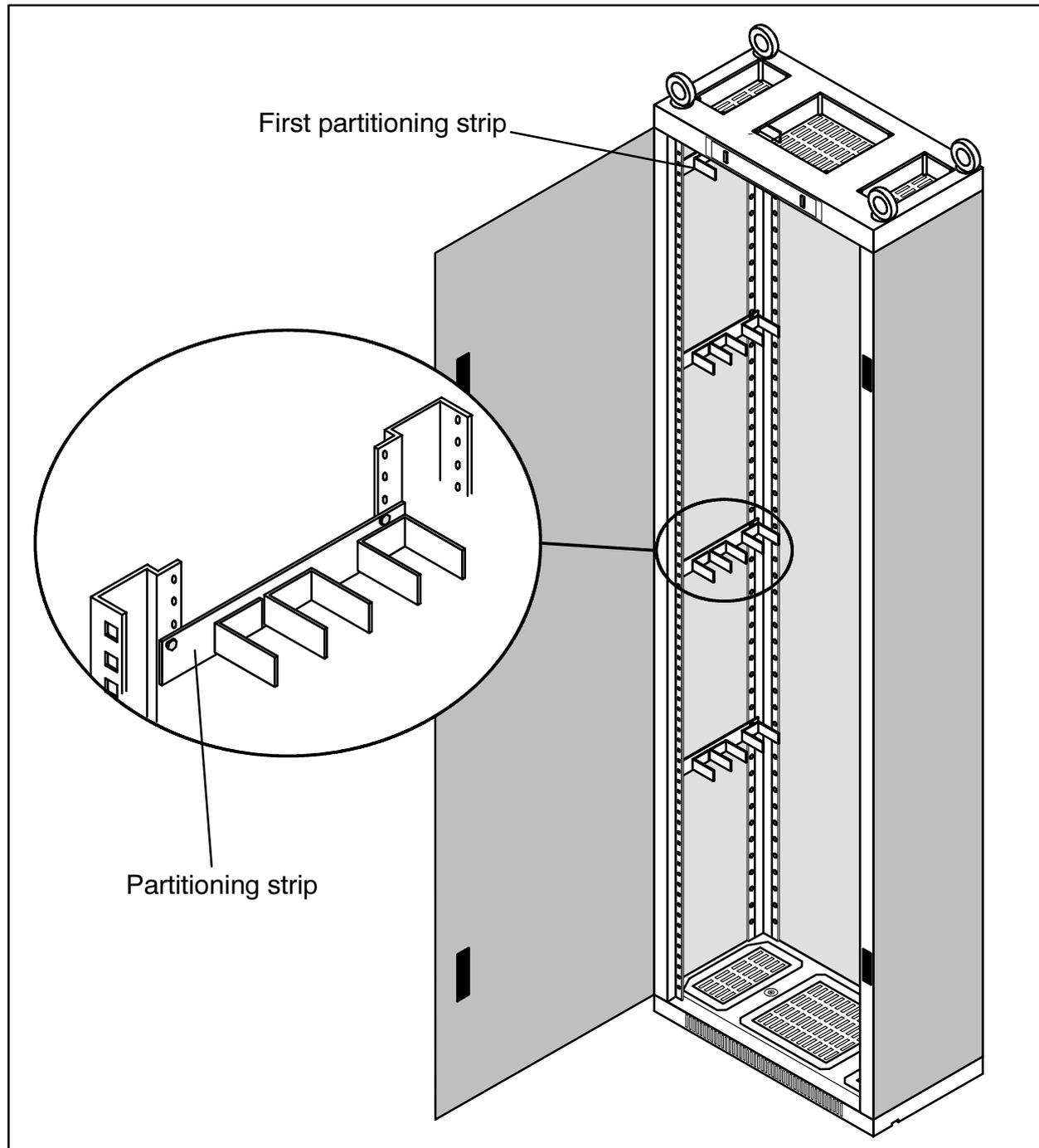


Fig. CC-16 Partitioning Strips

Rack and Cabinet Connections

Ground Connection

Inside each rack and cabinet, along the right-hand vertical support, a copper strap runs terminating in a lug which is fastened nearby the top square hole in the vertical support. The copper strap collects all the mechanical and electrical grounds relating to and originating from the subracks (Fig. CC-17)

The grounding lug must be connected to the station earth, via a specific cable having the characteristics indicated in Tab. CC-1 and Fig. CC-18.

For this purpose, remove about 5 mm PVC sheath from cable end and fit a suitable eyelet to the bare conductor. Fasten the cable end so prepared to the grounding lug using bolt and nut (M6).

— The same ground connection procedure must be carried out for the extension element (when supplied).

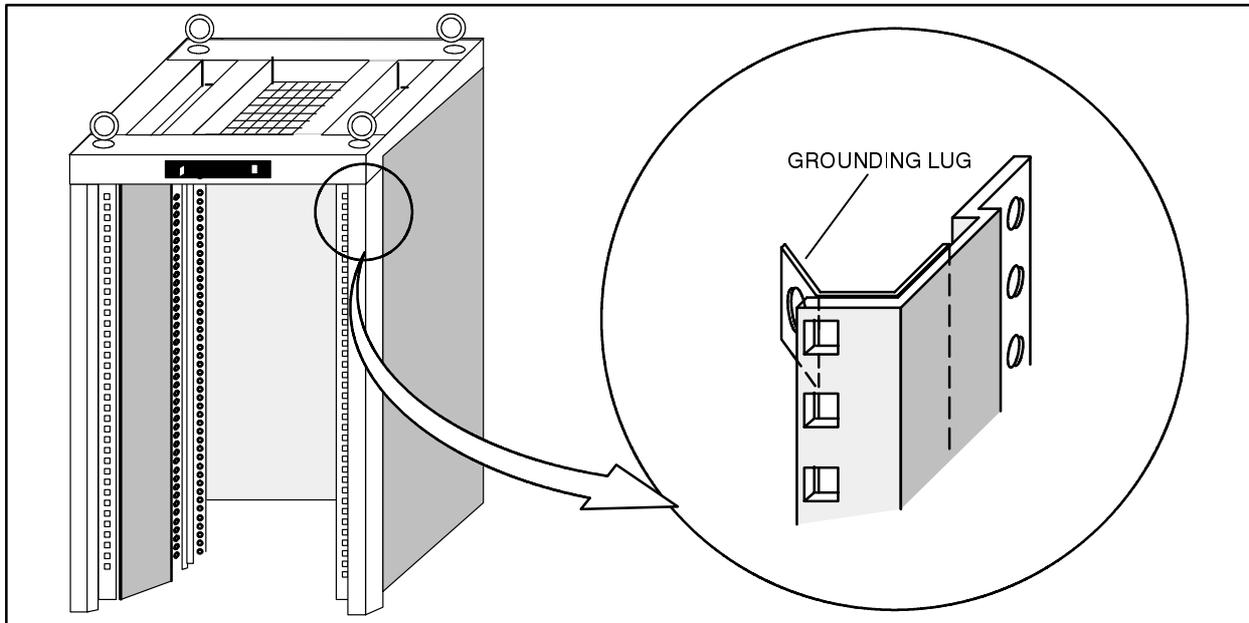


Fig. CC-17 Connecting rack to ground

CONSTRUCTION DATA		
Item	Description	Size
1	- Copper conductor	∅ 4.mm
2	- PVC sheath	
3	- Outer diameter	∅ 8.mm
4	- Diameter of conductors	∅ 0.1mm
5	- Sheath thickness	1.1mm

TECHNICAL DATA	
Description	Requested Values
- Temperature range - Nominal voltage - Test voltage	-40° C to 80°C 1kVa.c. 3kVa.c.

Tab. CC-1 Ground cable data

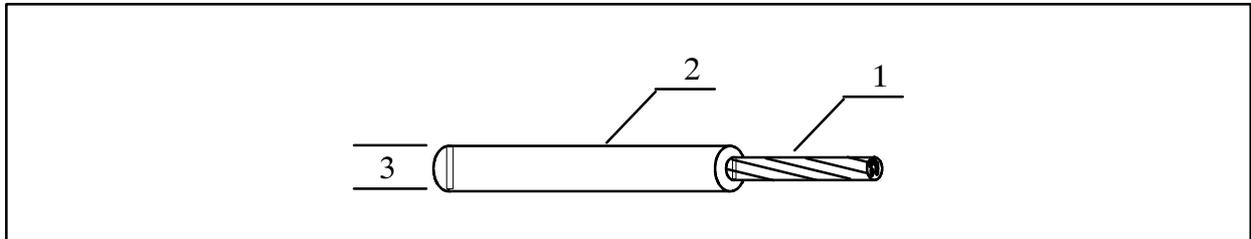


Fig. CC-18 Ground cable outline

Service Voltage Connection

A separate cable carries, an additional voltage of -32 to -72 Vdc (Service Voltage), required for the LEDs of the Rack Alarm Unit.

This supply is brought to the rack by means of two cables identical to those for the main voltage.

The positive and negative leads of each cable must be terminated with faston connectors which must be inserted in the relevant plugs J01 and J06 of Rack Alarm Unit. Verify the correct polarity connection before proceeding.

Two extra plugs J02 and J07 are provided to extend the positive and negative service voltages to another rack.

To obtain access to the Rack Alarm Unit remove the unit by unscrewing the two screws on the front.

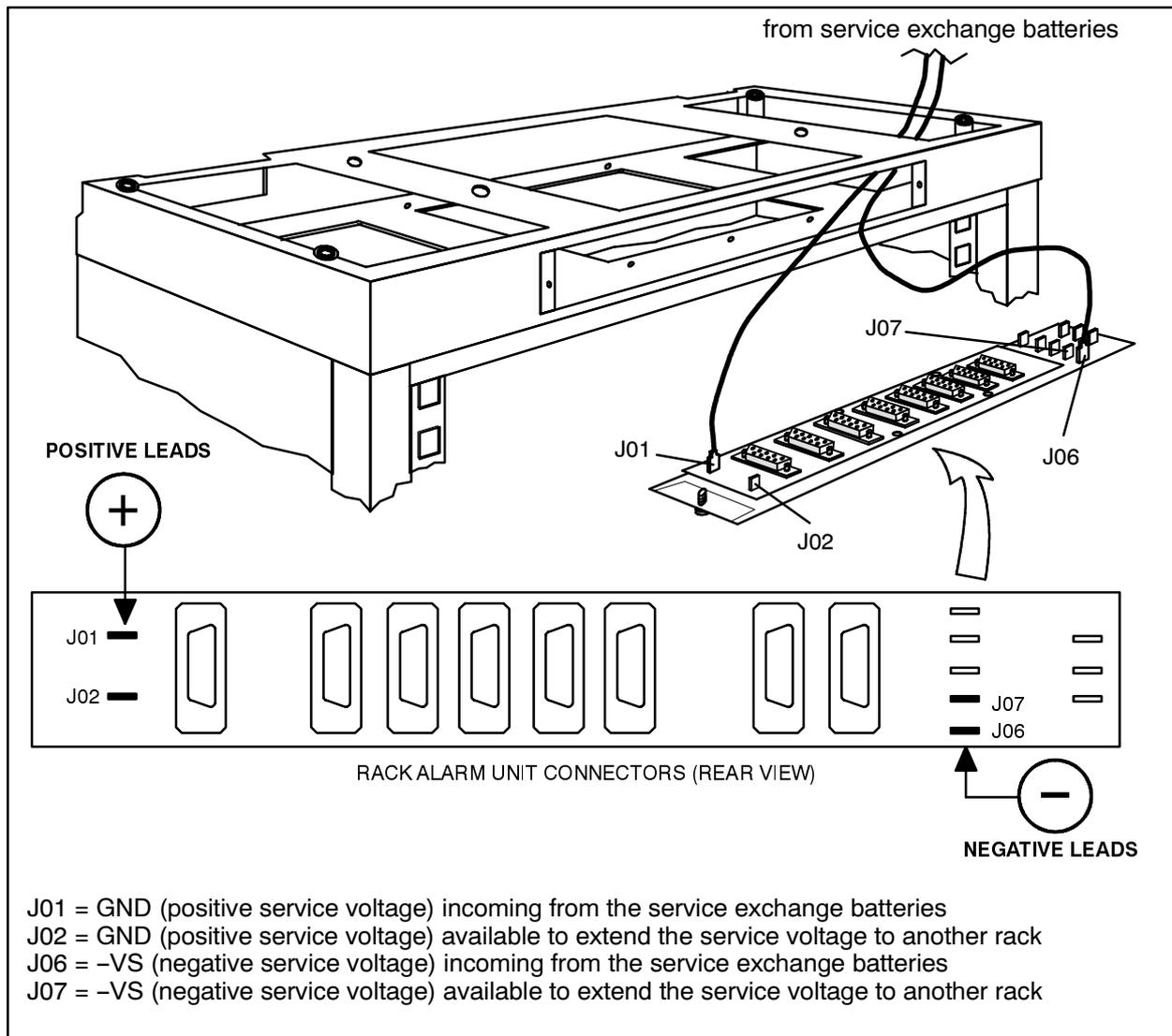


Fig. CC-19 Service voltage connection

Telesignal Connection

On the Rack Alarm Unit are terminals for the extension of rack summary alarms as ground signals.

The rack is fitted with a Rack Alarm Unit located on the top section. The unit receives the signals described in the Tab. CC-2.

The signals M, R, NURG_C and CALL_RX incoming from subracks are made available as ground contact alarms M, R and AUX (OR-gate of NURG_C and CALL_RX).

These alarm signals can be extended to an alarm panel in the exchange by means of single wires terminated in faston sockets to be mated with the terminals of the Rack Alarm Unit.

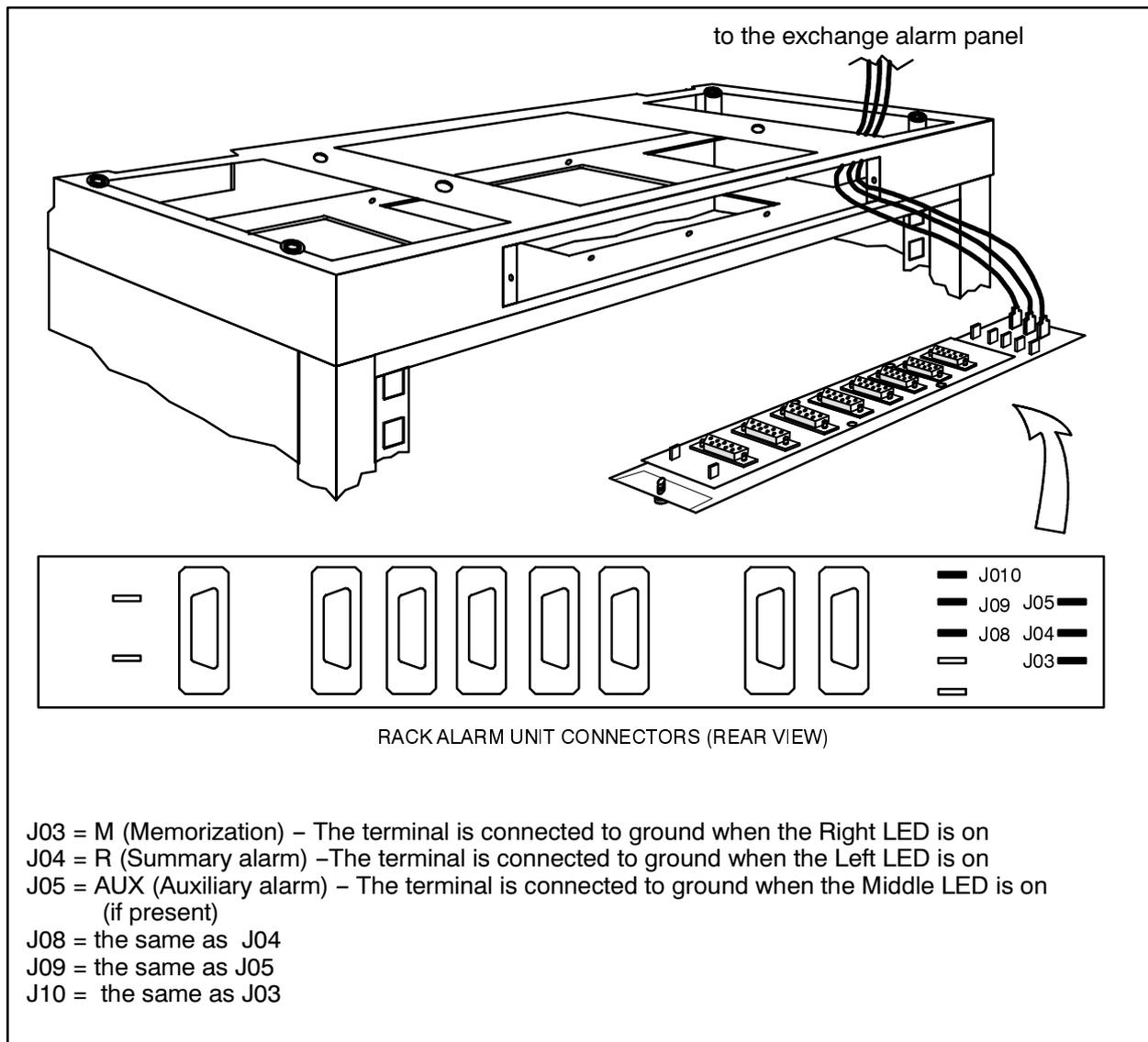


Fig. CC-20 Connecting rack alarms

Rack Alarm Unit Connection

1. Prepare the 9-pin connector cable for the Rack Alarm Unit according to the *Electrical Connection* Chapter instructions.
2. Insert the 9-pin male connector in one 9-pin female connector of the Rack Alarm Unit (Fig. CC-22).
3. Insert the other end (9-pin female connector) in the rack alarm interface connector of the subrack.
4. Fasten the Rack Alarm Unit in place using the relevant screws.

————— The Rack Alarm Unit can manage up to eight sub-racks, also from different racks.

The names of the available signals are listed in the table below, together with their meanings.

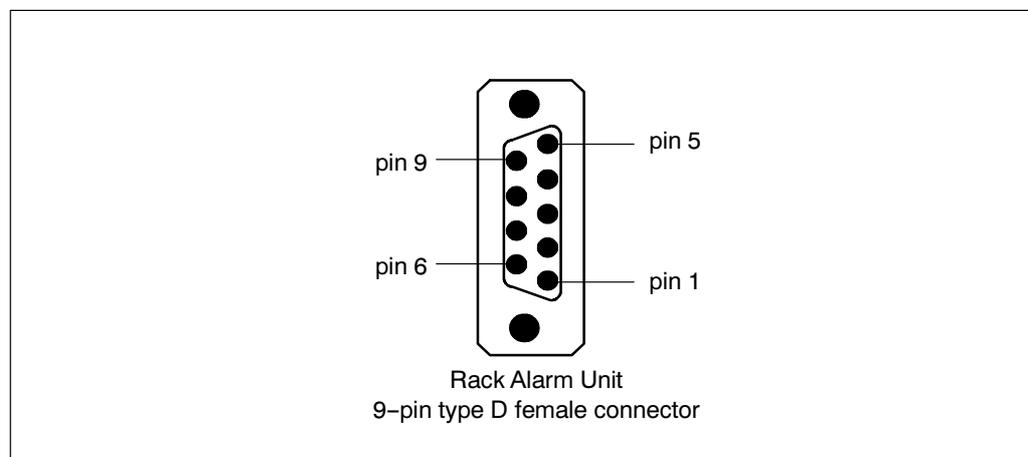


Fig. CC-21 From Y01 to Y08 connectors

Signal	Pin	Function
GND	1	Electrical ground
C	2	Clearing of rack alarm
M	3	Alarm storage control signal (Right LED)
R	4	Summary alarm drive control signal (Left LED)
NURG_C	5	Not Urgent alarm drive control signal (Middle LED)
-VS	6	Negative Service voltage
CALL_RX	7	Received Service Call (Middle LED)
	8	

Tab. CC-2 Rack LED control signals

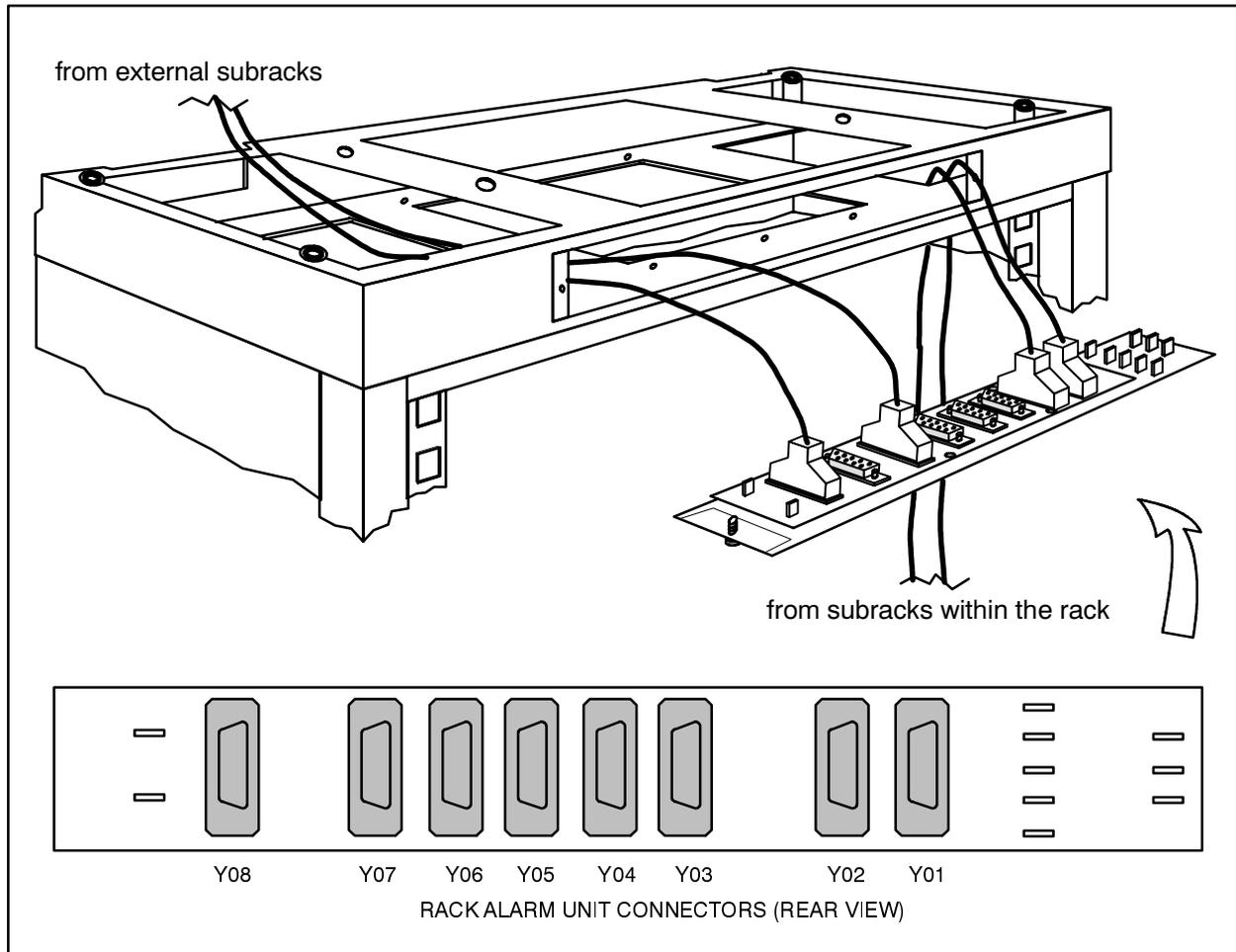


Fig. CC-22 Connecting rack alarms

Installation of Optical Fibre Cables

By reference to the location of the optical distribution frame in the exchange, provide the necessary lengths of optical single-fibre cables and suitably labelled on both ends.

Lay the o.f. cables as appropriate, i.e.:

- a) on the overhead structure of the exchange, if they are to be inserted through the rack top
 - b) or beneath the raised floor or in the cable ducts if they are to be inserted through the rack base.
1. Thread the cable in the rack through the left-hand opening, on the top or in the base depending on how the cables have been laid. Fig. CC-24 shows, exemplifies entry o.f. cable through the top opening.
 2. Bind the cables together using tape.

3. Remove the front cover of the plastic raceway on the left-hand side of the rack by proceeding as follows (see Fig. CC-23):
 - while pressing inward with one hand the staffed section of the duct where the lid begins, with the fingers of the other hand, remove the lid by pulling;
 - repeat the above operation removing as many lids as necessary to uncover the duct length from the rack top or bottom to the height of the subrack to be served by the optical cables. Start from the top or base of the rack according to whether the cables are run in the rack from the exchange structures or from a raised floor.
4. Insert the cable bundle into the raceway (see Fig. CC-24).
5. At the height of each subrack to be equipped with OLT units, extract the relevant o.f. pair by threading it out through the openings in the raceway.
6. Pay out sufficient length and place the o.f. pair orderly coiled on top and leave them coiled on of the subrack.

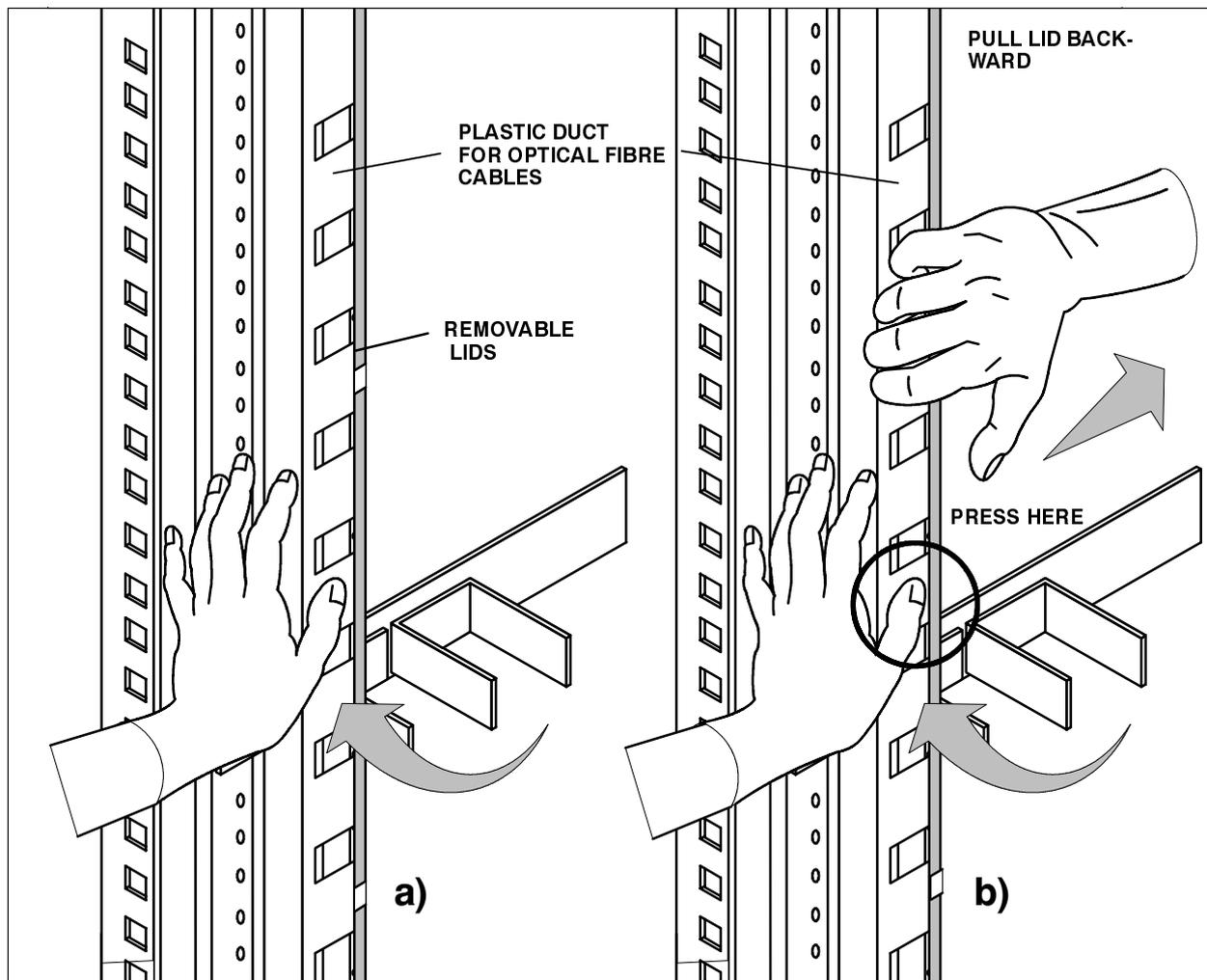


Fig. CC-23 Opening optical fibre plastic duct

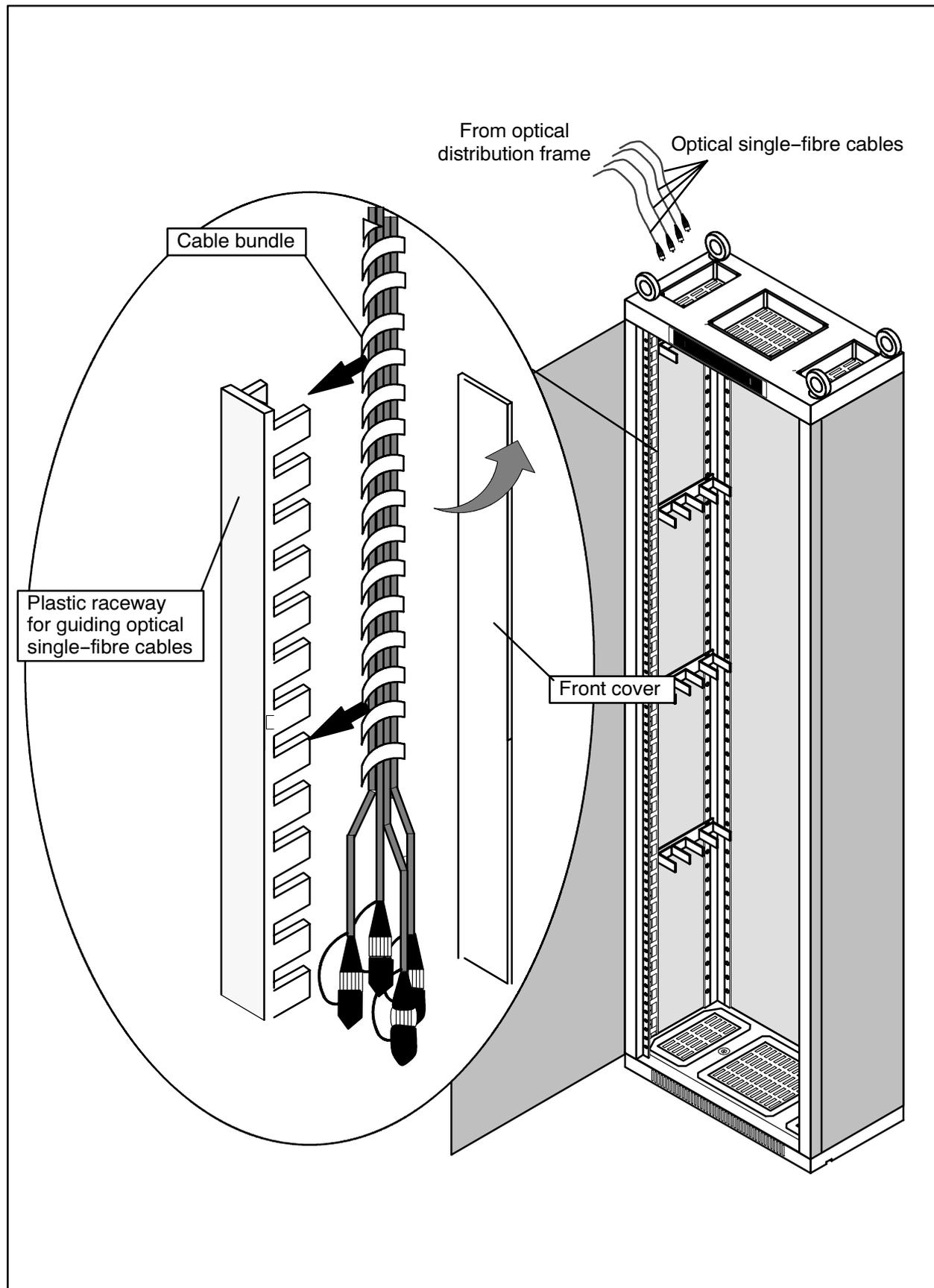


Fig. CC-24 Installation of optical single-fibre cables – entry through top opening